

A STUDY OF YOUNG INFANTS

AS SOCIAL BEINGS

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For my mother and to the memory of my father	
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ABSTRACT

In theories of development, an important but controversial question is whether or not young infants are social beings. For example, it is often argued that, while infants may appear to interact with adults, this is a mistaken impression until such a time as they have fulfilled certain theoretically defined criteria for sociability.

The aims of this study were first, empirically to evaluate arguments for and against the view that infants have an early sensitivity to other persons, and secondly, if such a sensitivity were found, to discover how it develops during the first six months of life.

Both an experiment and detailed naturalistic observations were made to answer the first question. The experiment produced preliminary evidence that the behaviour of two-month-olds is consistently different with persons and with graspable objects. This finding was supported by fine-grain analysis of a filmed interaction between a two-month-old and her mother which produced conclusive evidence that young infants are sensitive not only to the form of others' actions but to the social significance of their actions, insofar as those actions affect the infant's immediate interests.

Subsequent observations and experiments were made to find how social sensitivity or 'intersubjectivity'

develops during the first six months of life. These involved comparisons between infants' behaviour when interacting with their mother, with strangers and with novel and familiar face-masks. Behaviour was recorded on video-tape for approximately four minutes in each condition, twice a month, between six and twenty-eight weeks of age. Findings showed that there is a peak of social interest between six and ten weeks of age which is followed by a decline. This decline was due to a general increase in infants' ability to take active control of their surroundings - typified by their increased interest in objects and in playing interpersonal games (as opposed to participating in 'conversational' adult-infant exchanges). Associated with this decline of interest was increased 'negativity' during interactions with the mother and with other stimuli (i.e. actions of refusing or shutting out contact with other entities). Twelve examples of negativity are described in detail.

The thesis also includes a theoretical contribution to Lacan's and Winnicott's notion of 'mirroring', based on the analysis of maternal babytalk. This suggests that mirroring is not simply a social phenomenon but is also an ideological phenomenon and constitutes, therefore, a complex and salient form of social influence during early infancy.

The thesis concludes with a Spinozan argument that, notwithstanding their innate sensitivity to other persons, the development of infants as persons should be viewed as a more all-embracing process than is usually connoted by the phrase 'social development'; namely, as just one expression of the essential process by which humans increase their power of self-determination.

"And it's my first Acknowledgements Unbril senior, adding notes to his epic, "that they make use of some
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I also acknowledge my debt to all the mothers and babies who permitted me to record their behaviour with such good humour and to all my friends and relations who have had to endure the bad humour and egocentrism occasioned by my research during the last five years.

Notwithstanding these acknowledgements, I declare that the research reported in this thesis was conceived, conducted and written up entirely by myself.

"And it's my firm belief", said Gumbriel senior, adding notes to his epic, "that they make use of some sort of telepathy, some kind of direct mind-to-mind communication between themselves. You can't watch them without coming to that conclusion."

"A charming conclusion", said Mrs. Viveash.

"It's a faculty", Gumbriel senior went on, "we all possess, I believe. All we animals."

Aldous Huxley 1923

"For faith is not believing something which our intelligence denies. It is the choice of the nobler hypothesis. Faith is the resolve to place the highest meaning on the facts which we observe."

Gerald Heard 1949

regardless of the contradictions which it contains would be unwise, as one's research will necessarily reflect the position one takes with respect to these contradictions. The first two chapters in this thesis are conceived both as an historical survey of the main 'positions' which have been and are taken in the study of young infants as social beings and, by criticism of these positions, as an introduction to the writer's own orientation and concerns.

Chapter 1: INTRODUCTION

In the past decade an unprecedented number of publications has been produced on the development of social behaviour in young infants (e.g. Fontana's "Developing Child" series, Wiley's "Origins of Behaviour" series, Bowlby's writings, Richards 1974a, Ciba 1975, Schaffer 1977a, Lock 1978, Bullowa 1979a). This large and growing body of research represents a problem for the reviewer. While the publications in question are undoubtedly unified in terms of their subject-matter, their purposes and their conceptual underpinnings are diverse and, not infrequently, contradictory. About such central concepts as 'communication', 'intention', 'cognition' and 'emotion' there is no academic consensus, and even the concept of 'social development' - the main focus of my research - is fraught with difficulties. In a fertile and growing scientific movement, this is as it should be. Nevertheless to review 'the literature' regardless of the contradictions which it contains would be unwise, as one's research will necessarily reflect the position one takes with respect to these contradictions. The first two chapters in this thesis are conceived both as an historical survey of the main 'positions' which have been and are taken in the study of young infants as social beings and, by criticism of these positions, as an introduction to the writer's own orientation and concerns.

1. Social Development

The concept of 'social development' as psychologists know it today has its origins in the America of the 1930's. Its emergence was linked with acute political concern following the Wall Street crash and the intensifying domestic problem of integrating numerous immigrants - the usual influx swollen during this period by refugees from pre-war Europe - into a coherent society. The growing awareness of the difficulties inherent in 'social progress' came increasingly to be associated with an undercurrent of belief that changes in society might be brought about by modifying methods of child training and education (Danziger 1971). Towards the end of the decade the term 'socialization' was being frequently used to refer to the process whereby individuals are made into members of society (Clausen 1968).

Since this time, scientific studies of social development have tended to stress the word 'social' as meaning 'member of society' to the exclusion of the sense 'capable of interacting with others'. The idea is that social development is the process of becoming social. The corollary is that individuals are not social to begin with. Thus Martin Richards (1974b) has written "the human infant is born with a predisposition to become both adult and social" and Rudolph Schaffer (1971) began his book 'The Growth of Sociability' by stating that "at birth the infant is essentially an asocial being".

But if young infants are asocial beings, can they be affected by social influences? How can an infant's behaviour be "made social by its recognition and interpretation by adults" (Richards) if the infant is not already able to understand the meaning of others' behaviour? Alternatively, if human beings are born with a ready-made understanding of others, why is it

that adults find it so difficult to communicate unless they have similar past experience and share a common language? How is it that overlapping cultures and consecutive historical epochs can differ as much as they do?

In answering this type of question people usually take up one of two positions. They either stress individual and constitutional factors or the importance of experience in development but seldom both. Thus, in debates about race and I.Q.; about language acquisition; about sex differences; about mental illness; about creativity; about crime; about inter-group conflict; we repeatedly hear either that it is innate, instinctive, 'just human nature' or we are told that it is all to do with the way we are brought up, a social disease, 'the system'. But what both sides overlook - and what their frequent opposition expresses so eloquently - is that it is the tension between societal and constitutional factors which gives social development its character and that an adequate account of social development must focus not on society or the individual but on the interplay between the two. This is as true of the first six months as it is of any later period of life.

2. Social Development from a Cognitive Perspective

Schaffer's statement that neonates are asocial beings is supported by both observation and argument. First he points out that young infants lack important social abilities such as the discriminative use of vocalizations and the capacity for imitation. But even in cases where young infants do treat people and things differently Schaffer argues that their behaviour cannot properly be called social behaviour until they have certain cognitive abilities that are universally

required for sociability. An example is the experimental finding that even very young infants will spend more time looking at an adult's face than at any other naturally-occurring stimulus. ^(Kagan 1970) Schaffer argues that this is not because infants want or have a special relationship with other human beings but because infants are pre-programmed to be attracted by the stimulus-qualities which human beings happen to manifest. According to Schaffer's argument it should be possible to design a stimulus which satisfies young infants as much or more than their conspecifics (i.e. by combining pattern, contrast, brightness, cuddliness, colour, rhythmicity, multi-modality of stimulation, solidity, motility, etc. in an ideal way). His argument concludes that it is not until infants develop the concept of things as permanently-existing entities that they can begin to distinguish the qualities which make people different from complex physical objects (e.g. feeling and thought) and so become social beings.

This argument is often expressed. As Lamb (1977) writes "there is near unanimity among theorists that infants are capable of [social] attachment only after they have developed cognitively to such an extent that they have appreciation of the independent and permanent existence of others". This unanimity can be traced back to the profound influence of Piaget on our thinking about psychological development.

In his seminal writings Piaget argued that social factors could not play any special role in development "at least up to the fifth of the stages of sensori-motor intelligence that we have distinguished" (1947). In saying this he refers to a theory of infant development in which the primary psychological achievement is the attainment of an understanding that self and the world have independent existences. He argues that

this does not happen until approximately the tenth month of life. He supports this argument with a series of observations:

"at about five to seven months of age, when the child is about to seize an object and you cover it with a cloth or move it behind a screen, the child simply withdraws his already extended hand or, in the case of an object of special interest (his bottle for example) begins to cry or scream with disappointment. He reacts therefore as if the object had been reabsorbed." (Piaget and Inhelder, 1966)

He reports that the recovery of hidden objects only appears in the child's behavioural repertoire between seven and nine months of age and that it is not until nine or ten months of age that infants begin consistently to look for and find objects which are successively hidden in different places. Piaget argues that these observations show that before nine months of age children think an object which disappears no longer exists. In this case, they will misapprehend the external world and see it as no more than a flux of continually changing images. To the six-month-old people will just be pictures amongst pictures. Piaget concludes that only after acquiring the concept of 'permanent and independent existence' will infants begin to differentiate between their perceptions and distinguish the more enduring internal qualities which make people different from other perceptual phenomena.

The persuasiveness of this argument has, as we shall see, been reinforced by the influence of attachment theory (see pp. 29-43). Attachment theory proposes that the infant's first social relationship is characterised by precisely the quality which Piaget claims is misunderstood by young babies: constancy. As Mary Ainsworth (1973) puts it, "attachments bridge time and distance and cannot be conceived as being present or

absent, or varying in intensity, even over long periods of time". On this basis psychologists generally accept Piaget's argument that infants cannot be genuinely social until they are seven or eight months old (see Bell 1970, Lamb op.cit.).

In short the young infant's social life is considered by these psychologists to be unlike our adult social life in which the continuous existence of others - even those important to us - is seldom an issue. I may occasionally think of others who are absent and, under some circumstances, I may spend hours if not days wishing and hoping for some sign of life from them. But the vast majority of the people I know seldom if ever occupy my mind when they are not in my company. Attachment theorists and their like would seem not to recognise analogues of these less intense relationships in early infancy and, in consequence, they consider the acquisition of 'object-permanence' to be an essential prerequisite for social life.

This highlights an important shortcoming of the cognitive argument that young infants are not social beings. Certainly an understanding of the proposition 'people are permanently-existing entities' plays a part in adult social life. But so does an understanding of propositions like 'people are informative entities', 'people are comforting entities', 'people are frustrating entities' and 'people are amusing entities'. There is no logical reason why an understanding of permanent existence is necessary before infants can understand and act on these other propositions - even though such thinking and such action may be restricted to the 'here and now'. This suggests that experiments on object-permanence do not give adequate cause to conclude that infants are asocial beings.

This conclusion has important consequences. Most

importantly it rescues us from a predominant a priorism with respect to infant sociability. It has become commonplace to argue that even though young infants may act as if they are social beings, they are not truly social beings until they have mastered the concept of object-permanence (or 'reciprocity', or 'intentionality', see Schaffer 1977b). This means that observation is no longer the basis of beliefs about sociability: the criteria have become theoretical. But this attitude is contradictory. Piaget only drew the theoretical conclusions upon which psychologists are now basing their rejection of 'as if' evidence for early sociability because the babies he observed acted as if hidden objects did not exist (Piaget and Inhelder loc.cit.). To deny 'as if' evidence is thus to deny the validity of Piaget's claims. Alternatively, to accept Piaget's claims is to admit the adequacy of 'as if' evidence. We must accept therefore that the best scientific argument for or against the view that infants are social beings at birth will not be a theoretical argument about the presence or absence of certain cognitive abilities in the infant's mind but an argument about the empirical interpretation of early behaviours which look 'as if' they are social. (This point is taken up again in Chapter 2).

3. The Presence of Social Behaviour in Early Infancy

It has long been known that neonates are sensitive to both touch and taste. Until recently however it was thought they were relatively insensitive to sound and sight. We now know that this is not the case.

It is generally accepted that focal or highly discriminating vision does not attain adult standards before the fourth month of life. Nevertheless, with the aid of their immature vision, neonates can discriminate varying intensities of light, can differentiate

features of visual displays separated by as small an angle as 40' (some estimates suggest differentiation at 7.5' for optimal stimulus contrast, motion, etc.), are sensitive to colour, to visual motion and change, and will track a stimulus although somewhat jerkily (Haith 1977; Braddick and Atkinson 1979; Bornstein 1978).

Hearing is comparable in complexity to vision at birth. Neonates, including prematures and those with known abnormalities of the central nervous system, can differentiate sound on the basis of at least seven variables (band-width; duration; repetition-rate; inter-stimulus interval; frequency; loudness and pattern: Eisenberg 1970). Signals within the speech-hearing range are differentially effective. Thus infants as young as one month of age are able to make discriminations between voicing-onset times that distinguish similar sounding consonant-vowel pairs such as [ba] and [pa]. There are even suggestions that they perceive speech sounds along the voicing continuum categorically with boundaries that are universal in adult perception (e.g. Eimas et.al. 1971; Trehub 1973).

Given this early sensitivity (neonates are also highly sensitive to differences between smells) it is important that neonates are ready learners (Lipsitt 1966). They are not only quick to learn contingent relations between stimuli but can also learn higher-order rules governing the presentation of such relations - at least by four months of age. For example, Papousek (1969) set up an experiment where four-month-olds had to turn their head a certain number of times to the right and/or to the left to see a display of lights go on. They would work quite hard to solve the problems he set them (e.g. "left then right", "two to the left", "three to the right", etc.), vocalizing and smiling with pleasure when they finally found the

correct solution or grimacing if they failed. In the light of propensities such as these, it is not surprising that neonates quickly learn to distinguish their mothers from other people. This has been demonstrated with sight by four weeks of age (Carpenter 1973, Maurer and Salapatek 1976), with hearing by three weeks of age (Mills and Melhuish 1974) and with smell by six days of age (MacFarlane 1975).

Babies are also sensitive to the contingency of other persons' responses in interactions. Recent experiments by Lynne Murray (in prep.) have shown that eight-week-old babies will quite happily interact with their mother on 'live' closed-circuit television. But if a film of their mother is played back to them (i.e. no longer 'live') they find this upsetting and aversive. This implies that by eight weeks of age, infants expect their mother's behaviour to be affected by (or 'contingent upon') their own in certain regular ways - and are able to detect when this is **not** the case.

Observations such as these reveal something else about young babies: they are not just passively equipped for social life but exhibit a repertoire of social actions which sometimes appear as appropriate comments on their experience. This is something which was hardly guessed at before film and video-technology was used in observational research on infants.

Perhaps the least obvious class of the infant's communicative activities is comprised of simple unspecified motions. In the discipline of kinesics, methods of microanalysis of films of human communication have revealed that elements of interaction exist in the configurations of physical motions accompanying speech (Birdwhistell 1970). These methods, applied to interaction between neonate and caretaker, have revealed a synchronization of the organization of infant limb

motions with the articulatory segments of adult speech as early as the first day of life (Condon and Sander 1974). More specifically, some, possibly all, motions of the hands and arms appear to be adapted in form to become gestures. Certain gesture-like patterns of the hands are closely associated with other communicative forms of behaviour - particular facial expressions, forms of vocalizing and prespeech (see below). Some such 'gestures' are more frequently combined with 'expansive' open-mouthed expressions or calls - like those adults make in greeting or attracting attention, or to express excitement, surprise or anger. This category includes vigorous hand-waving and large open-handed or fisted movements. In contrast, index-finger pointing and finger-thumb closing with the hand held up over the shoulder or near the face are often synchronised with quieter moods of prespeech. (Trevvarthen and Hubley 1978).

Another group of specially adapted communicative behaviours are facial expressions. Since the innovation of Ekman and Friesen's Facial Action Coding System ('FACS' 1978), it has become possible to analyze adult facial expressions of affect into the 'atoms' of the different anatomical movements comprising them. There are forty-two elements. Virtually all of these can be identified in the facial movements of both premature and full-term newborns. Moreover, despite the presence of some diffuse, low-level activity difficult to score with FACS, the facial muscle actions of young infants are often well-defined and highly discriminable, even when occurring in complex configurations. The combination of these elementary muscle movements are non-random. For example, smiling in infants as young as four weeks of age is a facial behaviour simultaneously involving a relaxation of the brows and changes

in the lower face (Oster 1978).

Expressions of feeling are not the only movements of the face associated with communication between adults. There are also the movements of lips and tongue involved in speaking. Young infants manifest movements related to these which Trevarthen (1974, Trevarthen and Hubley 1978) has called 'prespeech'. The movements differ from adult speech however and are not voiced. This is to be expected as infant lower jaws are proportionately small, affecting mouth configurations used for vowel sounds and also limiting tongue mobility. Nevertheless, the movements closely resemble lip opening, tightening, pursing, closing and lip and tongue oppositions essential to forming adult speech sounds. They are sometimes associated with rudimentary, speech-like breath-control and often appear appropriately placed in conversation-like exchanges with adults.

Young babies make many different vocalizations. Four categories can be distinguished: crying, which may vary from consistent rhythmic vocalizations with a strained unhappy quality to arrhythmic fussing with considerable pauses; 'vegetative' sounds, associated with well-known physiological processes, such as burping, coughing, sucking, hiccoughing, etc.; 'neutral' sounds, such as grunts, groans, sighs and all other noises without obvious emotional content or physiological association; and cooing, which comprises sounds low in glottal stops and band-width, with smooth onset and a generally unstrained, happy quality. Of these categories, most work has been done on crying.

One of the best known studies of crying is Wolff's (1969). Wolff distinguished four types of crying in early infancy: the hunger cry, the pain cry, the frustration cry and the 'mad' cry. However, there is no evidence from spectrographic analysis that variation

between these cries is physically discontinuous. In interpreting them as he does Wolff places varying stress on his own intuitions, mothers' verbal interpretations and mothers' actual responses to the cries. More systematic work by Pratt (1977) has suggested that crying is not, as Wolff suggests, a 'discrete' system of signals, where cries are acoustically differentiated, being related to specific causes or infant needs (and thus decodable as such by others). Rather it is a 'continuous' system for coding distress, where signals may vary from being quiet and infrequent to being loud and continuous but with no necessary connection between particular cries and particular internal states. Pratt did distinguish two patterns of crying however: one which begins at a low level and slowly increases in loudness and frequency (associated with physiological needs) and the other beginning suddenly at a high level and continuing until the cry is alleviated (associated with a change in the baby's situation). But even on this basis, maternal responses to crying do not always have predictable outcomes and at times a response leads to a rise in the cry signal where a fall would have been expected.

Unlike crying, cooing is absent in the first month of life - there is thus no gradual transformation from one to the other. It increases in frequency during the second month and is at its height at the end of the third month (Lenneberg et.al. 1965, Stechler and Carpenter 1967). Cooing regularly accompanies smiling and is thus closely tied to the stimuli which elicit smiling. Longitudinally, the acoustic quality of cooing becomes gradually more variegated and by six months is differentiated into cooing and babbling, where babbling is characterised by consonant-like interspersions and supra-segmental intonation patterns (i.e. like cooing plus prespeech). It is from the rich

variety of infant babbling sounds that the first identifiable words emerge.

The final class of potentially communicative activities in early infancy are associated with gaze. During the first months of life visual motor behaviour (eye movement, eye closure and head turning) is the only motor system (besides sucking) over which the infant has substantial voluntary control (Papousek and Bernstein 1969). It is also the only 'on-off' perceptual system. Through eye closure and head turning, the infant has considerable control over perceptual input, and in a social situation this means control over the amount of visual contact. This control exists long before he or she has the motor capabilities to approach or escape physically from objects. The social importance of infant gaze, both theoretically and empirically, has been repeatedly stressed (e.g. Wolff 1963, Winnicott 1967, Robson 1967, Stern 1971) and is borne out by the behaviour and maternal commentaries reported later in this study.

4. Learning - Theory Approaches to Social Development

One of the most influential approaches to understanding social development during this century has been that derived from the theory of learning. Simply stated this leads to a view that the child's social behaviour can be explained by considering the history of rewards and punishments for various kinds of behaviour that he or she has experienced throughout infancy.

Learning theories of social development can be traced back to Watson's "behaviourism", the central tenet of which is that "all complex behaviour is a growth or development out of simple responses" (Watson 1930: 137). With our rapidly increasing knowledge of the complexity of early infant behaviour, this view is becoming ever

less tenable (although no-one denies that learning plays a central role in development at all ages). It is thus not surprising that disenchantment with learning theory explanations is frequently expressed. On the other hand, some current explanations of early development have many features in common with those proposed by learning theorists (e.g.: "human babies become human beings because they are treated as if they already were human beings"; Newson 1979). For this reason it is important to point out that learning theory, and the behaviourism on which it is based, has deficiencies other than an underestimation of the empirical complexity of infant acts.

In the first place, behaviourism was ostensibly a reaction against certain products of scientific idealism (i.e. psychological introspectionism; Watson 1930: 35). But one of the contradictions of behaviourism is that, insofar as it deals with traditional psychological phenomena, it remains dependent on a category of abstract mental phenomena in its explanations. Particularly revealing is the statement that "personality is but the end product of our habit-systems" (1930: 274). Habit-systems are clearly unobservable; they are also abstract and mental, although, Watson assures us, their true explanation will ultimately be physiological or chemical. However, he goes on, these physiological bases "are very complicated phenomena, far too complicated for us even to attempt to describe them". But he concludes, "fortunately we can continue our work in behaviour without awaiting the true explanation of these biological phenomena couched in physio-chemical terms" (1930: 210).

Thus, while in theory subscribing to the view that all human behaviour can be accounted for in terms of material causes, and devoting a large part of his book

'Behaviourism' to a description of basic human physiology, in practice Watson finds little need to refer to physiological make-up in explaining human behaviour, he does it all in terms of mental habit-systems. And as behaviourism has developed into learning theory, its mental bias has become more, not less, elaborate. For instance, the fundamental form of causation in learning theory is the action of stimulus on response; yet such causation is seldom simply physical - highly labile mental faculties such as motivation, perception and memory are almost always required for a stimulus to become causally effective. Yet learning theory leads to a view of infants as non-psychological beings. All that they are endowed with is a number of unconditioned movement-patterns (in Watson: hiccoughing, sneezing, smiling, crying, etc.) and a potential for the formation of habits by learning to respond systematically to the conditions into which they are born - insofar as these are somatically comforting or disturbing. So far as the behaviourist was concerned, what determined the outcome of development was not the infant's social constitution but 'society' - by which was meant "the men and women constituting it who have set up complicated patterns of response that must be literally followed" (because of the somatic rewards and punishments associated with them; Watson 1930: 208). Eventually, after infants have learnt these patterns of response, they will 'become social'.

This view of development can only be maintained if the degree of organisation of neonatal behaviour with respect to the environment were very low and infant learning were wholly passive. But both these assumptions are demonstrably false. Neonatal facial expressions, for example, are highly organised and show none of the qualities associated with the physiological

notion of 'reflex' (e.g. stereotypic form, constant conditions of onset). And, far from being passive in their acquisition of knowledge about what is going on around them, infants will work actively and persistently to discover the rules governing contingency relations between their own actions and environmental stimulation. Thus Papousek's (1969) experiment has shown that supine four-month-olds will make repeated attempts to work out what combination of lateral head turns (e.g. left-left-right; right-left; left-left-left; see p. 15 above) will produce the illumination of a panel of flashing lights above their heads. But, more importantly in this context, he has shown that infants will work at this task when they have lost all interest in food-rewards. Apparently problem-solving is its own reward, as they make facial and vocal expressions of pleasure when they finally guess 'right' and then lose interest until the experimental contingency rule is changed. Similarly, Watson (1972) has shown that two-month-olds take great interest in mobiles which move contingently upon the infants' actions, smiling and cooing at it significantly more than at mobiles whose movements are not contingent on their actions. Findings such as these demonstrate that infants not only actively seek knowledge about their world but seek it for other reasons than the attainment of comfort and avoidance of discomfort (i.e. for the satisfaction of simple physiological needs). They seem to enjoy learning to gain control over the stimulation to which they are subjected.

Behaviourist explanations can give no account of infants' pleasure in understanding and controlling the workings of their external world. Indeed behaviourist and learning-theory approaches to social development can only be maintained if the social senses of infants' facial and vocal expressions are systematically ignored

until such a time as these senses could have been learned. Thus, while most conditioning studies of infants ignore the significance of their social behaviours, the studies which do take account of these behaviours reveal that much more goes on in conditioning studies than conditioning. For example, Brackbill's (1958) study of "extinction of the smiling response as a function of reinforcement schedule" showed that after an initial period of social reinforcement by the experimenter, the withdrawal of reinforcement led to a complete extinction of smiling in the infants, not just an extinction to the previous operant rate of response. This complete extinction of smiling was associated with increased fussing and a refusal to make eye-contact with the experimenter and was apparently the product of an active rejection of the experimenter by the baby. While the spontaneous appearance of rejection can be understood in this context if it is granted that infants have an innate social understanding and a dislike of being 'stood up' by co-interactants, it cannot be explained if social behaviour is thought to be just a product of the infant's previous learning-experiences - as behaviourists claim.

Learning theory is tailor-made to supply a conception of development as 'socialisation' in the traditional American sense (see p. 9). But it concentrates exclusively on the development of norms, values and conventions, and thus severely underestimates the constitutional aspects of social being. In the same way, Newson's (1979) view that "human babies become human beings because they are treated as if they already were human beings" - quoted above - tends to lead to neglect of the constitutional corollary: that human babies must be able to recognise when they are being treated as human beings in order to become human beings - in which case they must know, in some sense,

what being human is (in which case they are already human beings!). In a similarly behaviouristic vein, Newson (loc.cit.) refers to the infant as "biologically pre-programmed to emit 'signals'" but, although these are undoubtedly understood to be far more sophisticated than any of the unconditioned responses described by Watson and his followers, their status as meaningful human expressions of real social purposes is denied, though no empirical evidence is offered to support this denial (cf. Chapter 5 below).

5. Psychoanalytic Approaches to Social Development

All theories of socialisation assume psychological preadaptations for becoming a member of society as well as behavioural preadaptations. Even those environmentalists who eschew references to the constitutionally 'given' aspects of social development have to employ notions akin to 'identification' in their accounts. Thus Bandura and Walters (1963) stress that an adequate social-learning account of development must find a way of accounting for 'modelling' effects - where the behaviour of an observing child is modified vicariously through reinforcement administered to someone else. And Berger and Luckmann (1967: 67), who claim that there is no such thing as human nature in the sense of a "fixed substratum determining the variability of socio-cultural formations", nevertheless accept Mead's (1934: 160) proposition that the personality arises by the process of the child "continually taking the attitudes of those about him, especially the roles of those who in some sense control him or on whom he depends".

Identification was originally a psychoanalytic concept. It can be defined generally as the "psychological process whereby the subject assimilates an aspect, property or attribute of another person and is transformed wholly or partially, after the model the other provides" (Laplanche and Pontalis 1973: 205).

But psychoanalysts distinguish different kinds of identification. Central amongst these distinctions is that between identification achieved by introjection and identification achieved by projection.

Introjection is the process by which the functions of an external 'object' (e.g. the mother) are taken over by its mental representation, by which the relationship with a person 'out there' is replaced by one with an imagined person 'inside' oneself. Thus the 'super-ego' is formed by introjection of parental figures and it may be analyzed into a number of component 'introjects' (The Good (Bad) Internal Father (Mother)). In psychoanalytic terms, introjection is both a defence and a normal developmental process; a defence because it diminishes (separation) anxiety, a developmental process because it renders the subject increasingly autonomous (Rycroft 1972: 77-78).

Projection is the process whereby "qualities, feelings or even 'objects', which the subject refuses to recognise or rejects in himself, are expelled from the self and located in another person or thing" (Laplanche and Pontalis 1973: 349). Projection is a primitive method of dealing with internal conflicts (a defence) which may be seen at work especially in paranoia, but also in 'normal' modes of thought such as superstition.

Projective identification is the process whereby a person identifies with a part of their self which they have projected into another who thus becomes a representative of their ego.

In psychoanalytic terms, identification by introjection and identification by projection are complementary processes. Thus the introjection of a persecutory object is to some extent determined by the projection of destructive impulses onto the object. Similarly, the drive to project (expel) badness is increased by

fear of 'internal' persecutors. And the same relationship holds between the introjection of good objects and the projection of good feelings. Identification is based on this duality.

The concept of identification has found its way into psychological thinking despite Freud's equivocal position amongst psychologists. It is a central feature of his general theory of the adult psyche. Freud did not write much about the first year of life - indeed he is said to have viewed it only as "a dark mystery" (Jones 1961: 280). He did however express a view of development: that both constitutional 'instincts' and environmental 'traumata' play a role, that there is a capacity for both pleasure and 'unpleasure' in the child, and that understanding comes about only through environmentally-caused frustrations provoking 'unpleasure' in the child who, as a result, seeks to avoid such frustrations in the future by developing a better knowledge of the world or "reality-testing" (e.g. Freud 1911 1925, Spitz and Cobliner 1965). He also suggested that infants' major psychological preoccupations would be centred on things to do with their mouths, especially with respect to the breast and feeding. And, in line with his division of instincts into the self-preservative and the destructive, he suggested that there would be both an oral-erotic and an oral-sadistic stage in infancy (Freud 1933).

The most systematic theoretical development of these ideas is that represented by the work of Melanie Klein. Klein specialised in the psychoanalysis of children. She was enabled to do this by making interpretive use of the symbolism contained in children's play (the 'play-technique'; Klein 1955). Also, unlike Freud, she observed infants behaving from the first weeks of life (Klein 1953a). Her major theoretical innovations

particularly concern the first six months of life. In this period she distinguished two phases which she called, respectively, the paranoid-schizoid position and the depressive position. (Klein 1953b)

For Klein, as for most psychoanalysts, the major problem facing any individual - and also the major spur to development - is coping with anxiety. She thought that, in early life, anxiety resulted from the interplay of external and internal sources: the experience of external dangers (e.g. a traumatic birth) as anxiety-provoking depending not only upon the event itself but also upon the infant's ability to apprehend events as either threatening or benign which, in turn, depends on the innate conflict between destructive and preservative instincts. The paranoid-schizoid position consists in methods of dealing with the anxieties which characterise the first three or four months of life. The most important of these defences is splitting. In splitting the infant denies the existence of internal conflict by viewing the 'good' (accepting, benevolent, comforting, nurturing, etc.) aspects of the world as having no connection with its 'bad' aspects (e.g. frightening, malevolent, denying, harmful). As Klein believed the young infant's social world was almost completely dominated by the mother (in particular, her breasts), she talks of infants denying conflict in themselves by imagining that they have two mothers: a good mother, whom they idealise as wholly loving, omnipresent, without fault, and a bad mother onto whom they project all their destructive impulses, feeling her to be persecutory and rejecting. Infants thus become involved in two relationships: a loving relationship with their good mother and a hateful sadistic relationship with their bad mother. In Klein's view the success of human social development is measured by the extent to

which individuals overcome such a division in the way they view their fellow beings. (Klein 1957)

At about four months of age, provided constitutional and maternal adequacy, infants' attitude to their mothers begins to change - this is the beginning of the depressive position. The infant begins to realise that both love and hate have been directed at the same person. In becoming aware of their ambivalence they begin to feel guilty and to want to make reparation for the harm they think their hate has done to their loved 'good' mother. Failure to negotiate this transition accounts for an inability to trust others in adulthood, obsessive envy and, in the worst examples, for paranoid and schizoid disorders. Success in working through both positions accounts for the ability to rise above jealousy and criticism, for genuine gratitude and generosity and for the ability to negotiate frightening and depressing experiences in adulthood (e.g. persecution and bereavement).

Klein's theory of early social development is the most sophisticated of its type, detailing not only the emotional structure at the basis of development (i.e. conflict between preservative and destructive instincts) but the processes by which experiences affect that structure (e.g. projection and identification). What it lacks is an adequate base in rigorously-analysed descriptions of infant behaviour. The only observational work Klein has published is apparently intended more to illustrate her theory than to test it (1953a,b).

6. Attachment Theory

The main influence of Klein's thinking - and of psychoanalysis as a whole - on modern developmental psychology has come through the work of John Bowlby. Bowlby was originally trained as a psychoanalyst under

the supervision of Melanie Klein. His principal contribution to psychology was combining psychoanalytic thinking with traditions and insights from the observational science of ethology. The fruits of this combination found expression in a powerful theory of social development: 'attachment theory' (Bowlby 1969 1973 1980).

The idea inspiring attachment theory is that

"human beings are happiest and able to deploy their talents to best advantage when they are confident that standing behind them there are one or more trusted persons who will come to their aid should difficulties arise" (Bowlby 1979).

Bowlby's originality lay in proposing that this dependence had evolutionary origins.

It is generally recognised that young human beings are more helpless, and helpless for a much longer time than other young mammals. Bowlby argued that there must therefore have been strong evolutionary pressures for the selection of infant behaviours which promoted parental protection during this period - especially protection from predators. He argued further that this evolutionary endowment would have important psychological consequences - amongst which would be universal dependence on trusted persons in times of difficulty.

This was a controversial view when considered from the perspective of social-learning theories of development which were prevalent in psychology when it was first put forward (Bowlby 1958). These did not assume that babies were, or would naturally become, social - as Bowlby was suggesting - but argued rather that they were made social by those who brought them up, ultimately through the child associating social behaviour with somatic rewards (see pp. 20 - 25 above).

In marshalling evidence to corroborate his view, Bowlby's attention turned particularly to the first and second years of life. He showed that young humans - along with other young primates - are biologically endowed with a number of behaviour-patterns which naturally promote the protective proximity of the mother: sucking (nutritional and non-nutritional), clinging, following, crying, smiling, babbling, calling, grasping, reaching, visual orientation, eye-to-eye contact, and locomotion as used in approach and seeking. Many of these behaviours are present at birth. Bowlby then proposed that, during the first year of life, the behaviours become incorporated into sophisticated 'goal-corrected' systems which serve to maintain mutual proximity between mother and infant under all conditions. A number of phases can be distinguished in this development: familiarisation with caretakers, discrimination of the mother from others and recognition of the mother's (or mother-surrogate's) continued existence when not perceptually present. It is only with this last development - with the acquisition of 'object-permanence' - that the infant's behaviour takes on the time- and space-bridging qualities that distinguish 'attachments' from the infant's other transactions with the environment.

The influence of attachment theory in both lay and scientific circles has largely been due to the support and apparent 'explanation' it gives to a number of far-reaching conclusions about social development which Bowlby had published in the late 1940s and early 1950s. The central tenet of all these conclusions concerned the crucial importance of experiencing a warm and continuous relationship with a single adult during early childhood as a basis for maturing into a sane and healthy adult. Thus, from a study of forty-four

juvenile thieves which he published in 1947, Bowlby concluded:

"There is a very strong case indeed for believing that prolonged separation of a child from his mother (or mother-surrogate) during the first five years of life stands foremost among the causes of delinquent character development and persistent misbehaviour."

And, in his next book - a review of scientific studies of the needs of homeless children with respect to mental health (1951, 1953) - Bowlby came to the more far-reaching conclusion:

"that when deprived of maternal care, a child's development is almost always retarded - physically, intellectually and socially - and symptoms of physical and mental illness may appear". (my emphasis)

Bowlby's first formulation of attachment theory was published in 1958. Because it appeared to provide an explanation for the above conclusions as well as defining the principal parameters for early social development, it attracted immediate and widespread scientific attention. Subsequent research has revealed that it has both empirical and logical deficiencies. These deficiencies are summarised below.

(i) Maternal deprivation does not necessarily damage a young child's social development.

Bowlby (1953: 14) made a distinction between partial and complete deprivation. If a child is separated from his or her mother for any length of time - but is subsequently reunited with her - this is known as partial deprivation. Complete deprivation occurs when

"a child has no one person who cares for him in a personal way and with whom he may feel secure" - as might be the case in orphanages, residential nurseries and hospitals.

"Partial deprivation brings in its train anxiety, excessive need for love, powerful feelings of revenge, and, arising from these last, guilt and depression ... Complete deprivation has even more far-reaching effects on character development and may entirely cripple the capacity to make relationships with other people."

Subsequent research has shown that these conclusions were too sweeping. Thus, although short-term separations - even those lasting only a few minutes - may result in increased ambivalence in one-year-olds on reunion with their mothers (i.e. intensified contact-maintaining behaviour combined with contact-resisting behaviour, avoidance, pushing away and crying; Ainsworth and Bell 1970), this sort of reaction depends very much on the circumstances in which the separation occurs. If it occurs in familiar surroundings or in the company of friends, the baby's negative reactions are less intense or completely absent. (Rheingold and Eckerman 1973, Solomon and Décarie 1976). The effects of longer-term separations are also dependent on the social circumstances in which they occur. Thus Rutter (1976) reports a study which shows that a single separation from both parents only causes an increased tendency to antisocial behaviour (in boys) if the boy comes from a 'poor marriage' home. However repeated separations even from 'good marriage' homes do predict greater anti-sociality. (These findings correspond to the findings of Hinde and his colleagues (see Hinde 1974) from studies of mother-infant separations in rhesus monkeys; namely, that the infants who showed

greatest disturbance following a short separation were those who had shown the most 'tension' in their relationship with the mother prior to separation.) Even 'complete deprivation' of mother or mother-surrogate does not necessarily result in increased delinquency. Thus in studies of children from broken homes, a distinction can be drawn between those broken by death and those broken by divorce or separation. As Rutter (1972) reports, it is only the latter which show a strong association with delinquency.

(ii) There is confusion between the concepts of 'attachment' and 'relationship' in research on infant development.

Bowlby's initial conclusion from observations of the protest and despair associated with separation of mothers from children was that from the first year of life there must exist a mother-child 'bond' which separation broke or damaged. Attachment theory focusses on describing and explaining the development of this bond. What subsequent research on maternal deprivation has shown is that a distinction must be drawn between infant-adult attachments and infant-adult relationships. Thus Rutter concludes his reassessment of findings about the effects of maternal deprivation on young children, published in 1972, on almost the same note as Bowlby's 1951 conclusion: that the long-term consequences of maternal deprivation seem to point to

"lack of a stable, persistent, harmonious relationship with a parent [as] the crucial variable".

Yet, in the same book, Rutter shows that there is good cause to question many features of Bowlby's attachment theory (especially his claims about 'monotropism'; see

below). This suggests that an adult-infant 'attachment' is not the same thing as an adult-infant relationship.

To begin with, it appears that the literature on attachment theory disconfirms the claim that there is a distinction to be drawn between 'attachment' and 'relationship'. Thus, both Mary Ainsworth (1969), who entitled her review article, "Object relations, dependency and attachment: a theoretical review of the infant-mother relationship", and Schaffer and Emerson (1964), who write about "the infant's first social relationship ... and subsequent attachments", treat the two concepts as interchangeable. Even Bowlby (1969: 221-222) makes a claim that attachment theory is a theory of "the nature and origin of the child's first social relationship". Elsewhere, however, he makes a distinction:

"a child's attachment is only one component in the bigger system of a mother and child in interaction" (1969: 394).

Indeed, if one refers to his original theoretical formulation, one finds that he only proposed attachment theory as a theory "of the positive aspects of the child's tie" (1958; my emphasis).

This conceptual confusion has had important consequences because, in their general statements about the importance of infant-adult relationships, attachment theorists have usually been proved correct by subsequent research. But in their specific statements about 'attachments', they have usually been proved incorrect.

(iii) Young infants are not monotropic.

A good example of a specific claim which Bowlby built into his theory of 'attachment' (as opposed to

'relationship') and which has subsequently been shown to be incorrect in his claim that young infants are 'monotropic'. He argued (1958 1969) that there is a natural bias for children to attach themselves to one figure only, whereas they may have a number of less intense 'relationships' with other figures. He then went on to claim that a child's 'attachment' differs in kind from relationships with other subsidiary figures. Subsequent research has shown this claim to be incorrect.

For example, Schaffer and Emerson (1964) report a large-scale study (N=60) in which they found the sole principal attachment was to the mother in only one half of the eighteen-month-old children they studied and in nearly a third of the cases the main attachment was to the father. Although there was usually one particularly strong attachment, this seemed to be a product of social circumstances - the absence of second caretakers - rather than of an innate 'monotropism'. Thus most of the children showed multiple 'attachments' which varied in intensity from person to person and from day to day. A similar picture was revealed by Ainsworth's (1963) study in Uganda.

Interestingly, the observations made by Schaffer and Emerson when their subjects were twenty-four weeks old showed that all sixty of them had formed "indiscriminate attachments" by this age - that is, a preference for human company over isolation - while only four had formed "specific attachments". This suggests, once again, that social life in infancy is much more complex than the concept of a single, bond-like 'attachment' would lead us to believe.

(iv) Research on early social development suggests that 'attachments' may not form in the way attachment theory proposes.

Schaffer and Emerson's (1964) findings raise important questions about how attachments form. Bowlby (1969) proposed that attachments are control-systems which grow from the infants' species-specific endowment of reflex-like behaviours which promote proximity to their main caretaker. But Schaffer and Emerson (1964) found that, even where infants' primary caretakers might be their mothers, their most intense relationships were not infrequently formed with their fathers (or other relatives). This suggests that the possession of reflex-like behaviours promoting proximity is not the only factor in the formation of attachments, but that an added element of selectiveness must be involved. Schaffer and Emerson tested a number of variables and came to the conclusion that the most important were the attachment-figure's responsiveness to the infant's crying and the number of interactions he or she initiated with the infant. Subsequent research has reinforced and amplified this conclusion. Thus Ainsworth and her colleagues have picked out four important factors in the development of attachments which not only determine to whom attachments are formed but also how secure they are: the caretaker's sensitivity to the infant's signals, his or her acceptance of the baby's demands (as opposed to rejection of them), co-operation with the baby's actions rather than interference, and his or her availability for interaction with the baby (Ainsworth Bell and Stayton 1974).

Findings such as these suggest that there are two co-existent views of attachment-formation. The first is the 'official' theoretical view that

"the child's tie to his mother is a product of the activity of a number of behavioural systems [e.g. crying, following, sucking, looking - formerly called 'component instinctual responses'] that have

proximity to mother as a predictable outcome" (Bowlby 1969: 223).

The second or common-sense view is that a child's attachments to adults are the product of the history and nature of his or her interactions with them. While these two views are not necessarily incompatible, only the second has empirical support.

(v) The empirical claims that attachment theorists make about adult-infant interaction have many deficiencies.

These deficiencies can be summarised as follows:

(a) Attachment behaviours are usually referred to as 'reflex-like' (e.g. Ainsworth Bell and Stayton 1974). But, when examined in detail, the majority of the behaviours referred to as 'reflex-like' - smiling, crying, calling, following, sucking, etc. - are not reflex-like, varying both in form and in conditions of elicitation (see pp. 14-20 above).

(b) Attachment theory and the research to which it has given rise seriously underestimate the range of infant social behaviours and the sophistication of early infant-adult interactions. For example, attachment theory makes no mention of the negative, interaction-denying, social behaviours which infants manifest from the first days of life onwards (e.g. gaze-avoidance, 'fretting', 'negative' facial expressions, back-arching when picked up, etc.). Neither does the research supporting attachment take account of the impact of infants' interactive behaviours - both negative and positive - on their caretakers having attained proximity with them. This leads to a neglect of the infants' activities in determining their own social development (cf. Bell 1968 1971).

(c) Attachment theory depends to a large extent on extrapolations into our evolutionary past. However plausible these extrapolations may be they never constitute convincing evidence for a particular point of view, simply because there is so little possibility of us finding out whether they are correct.

(d) Attachment theory refers to attachment formation as the product of species-specific mechanisms inherited by human infants and mothers. The phenomenon of 'wolf children' (Malson and Itard 1972) - where human babies are reared by and coexist with non-human mammals - would seem to show that this assumption is incorrect.

(e) Much of the experimental evidence supporting the theory of attachment-formation is in the form of causal conclusions drawn from correlations between infant behaviours and maternal behaviours (e.g. Ainsworth Bell and Stayton 1974). But correlations can reveal nothing about causal relationships - more detailed description would be required for that.

The study most usually quoted to refute this objection is that by Bell and Ainsworth (1972) on infant crying. This study showed statistically significant positive correlations between maternal unresponsiveness and duration of infant crying in each of the last three quarters of the infant's first year. Similar positive correlations were found between the number of episodes of crying ignored by mothers and the frequency of their infants' crying during the second six months of life. There were also statistically significant correlations showing that infants whose mothers most frequently ignored their crying in any one quarter of the year were likely to be among the most frequent criers in the next quarter. (This was also true of maternal unresponsiveness and infants' subsequent duration of crying). Much was made of this fact, suggesting as it did temporal cause-effect relations between maternal

behaviour and infant crying. However, this is not a simple cause-effect relation, for Bell and Ainsworth's figures show almost as many significant positive correlations in the opposite direction (i.e. between infant crying and subsequent maternal behaviour: 4 significant correlations versus 5 for duration, 2 versus 3 for frequency). Moreover, 'crying' was treated as a unitary phenomenon in this study: no account was taken of individual differences in cry quality or in facial and behavioural accompaniments to crying. Individual differences such as these might well have affected maternal responsiveness in ways unknown to Bell and Ainsworth. Their conclusion that "maternal responsiveness tends to result in a decrease of crying behaviour" is thus to be viewed with scepticism - particularly since subsequent research has failed to support it (Clarke-Stewart 1973).

Diverse as these empirical deficiencies may seem, they do have some underlying consistency; they tend to suggest - incorrectly - that infants' awarenesses and activities play no role in the formation and disruption of early infant-adult relationships.

(vi) Attachment theory conforms to dominant ideological patterns in our culture.

Because there are so many empirical gaps in attachment theory, one must ask where the bits of it which are not empirically supported came from. We have seen, for example, that Bowlby claimed that infants were 'monotropic' without empirical support. Similarly, Stayton, Hogan and Ainsworth (1971) argue that infant disobedience is caused by maternal insensitivity, when their results (consisting of simple correlations) could equally well support the opposite conclusion. Lee Comer (1974) suggests that biases like these conform to an unconscious sexism with respect to child-rearing

practices in our society. Thus what unifies the inadequacies of attachment theory is their contribution to the view that rearing children is the responsibility of mothers rather than fathers, and if children do not develop into desirable members of society, then the mother is to blame - not the child or the father or the social circumstances which provide a background for children's upbringing.

While few would claim that psychological theories can ever be completely independent of ideological forces, awareness of those forces is clearly an advantage when putting forward such theories. The inadequacies of attachment theory have a unity which suggests that its proponents may be less independent than they might be from the prevailing Western ideologies concerning the rearing of children.

(vii) Due to Bowlby's dependence on Piaget's assumption that infants cannot relate to people as people until they have acquired the concept of 'object-permanence', attachment theory underestimates the social competence of young babies.

Attachments are not supposed to form until infants have acquired the concept of object-permanence (Bowlby 1969, Ainsworth Bell and Stayton 1974). Following Piaget, this is supposed to occur approximately nine months after birth. However, as argued on pages 10 - 14 above, there is no logical reason why infants should not relate to people as people before they recognise that people are permanently-existing entities. Moreover, from experiments on person-discrimination (e.g. Macfarlane 1975, Carpenter 1973, Mills and Melhuish 1974) it appears that young infants do know the difference between their mothers and other people within the first weeks of life. Thus it might well be that this difference is important to them but that until eight or nine months of age they are unable to conceive the passing of time: they

have no conception of past or future, everything that happens to them just 'is so' - even when they are active (e.g. crying or reaching), their activity is just 'the thing to do at the time'.

Even if the concept of object-permanence is necessary for the formation of certain types of relationship, its acquisition occurs much earlier than attachment theorists generally recognise. Experiments by Bower (1974) show that infants are aware of the continued existence of imperceptible objects at least as early as the third month of life.

In the light of these criticisms, attachment theory cannot be said to provide a viable explanation of social development in the first year of life. Yet, to dismiss completely the writings of attachment theorists would be a mistake because at the heart of what they are saying is an important truth: that

"human beings are happiest and able to deploy their talents to best advantage when they are confident that standing behind them there are one or more trusted persons who will come to their aid should difficulties arise" (Bowlby 1979).

Attachment theory does not explain why this should be so yet both the findings of attachment theorists and those of their critics suggest that it is so.

In reading the literature on attachment theory one comes across many similar statements which, while not directly deducible from attachment theory, have the ring of truth about them and are not refuted by any published empirical work known to me. For example:

"To an infant, an adult's commands and prohibitions are not at first semantically meaningful; rather he is likely to respond not so much to the verbal content of a command as to the tone of voice with which it is issued, and to accompanying facial expression, gesture and posture" (Ainsworth Bell and Stayton 1974).

This ability is well-known to many of those who have cared for young babies (or for animals), yet how babies should 'know' the difference between a command and, let us say, a joke is difficult to explain. One

'explanation' which makes sense is that such knowledge is 'natural' to all human beings. In this case the difficulties adults have in communicating in intimate conversation would seem to suggest that this natural understanding is somehow interfered with during development. Whether and why this might be the case is discussed in the final two chapters of this thesis.

7. Recent developments in observational research on early infancy

Whereas the link between Klein and attachment theory was their common stress on emotional structure, the link between Klein and the most recent developments in observational research on early infancy has been an interest in the types of psychological process supposed to underlie socialisation. This latter movement has quite different origins, namely, the psychology of early linguistic communication rather than the psychology of early relationships.

During the 1960s Chomsky's views of early language development dominated research on the subject. This was characterised by two major stresses, the first on the grammar of children's utterances, the second on the autonomy of language development. Research suggested that children acquired a sophisticated understanding of the grammar of the language to which they were exposed very quickly. So fast was this acquisition that Chomsky supposed children to be born with a specific device for the abstraction and formulation of syntactic rules from speech, a device which operated quite independently from the processes involved in their slower progress towards more general cognitive understandings (e.g. Piaget and Inhelder 1966).

Although it is now recognised that young children have much more sophisticated cognitive skills than was proposed in the 1960s (Donaldson 1978), the principal attack on Chomsky's position originated from linguistics. Without denying the innate sophistication of infants' sensitivity to the linguistic structure of speech (Schlesinger 1977), it has become usual to argue that Chomsky's view takes

insufficient account of meaning. This argument is put forward on two counts, that of production (Bloom 1970 1974) and that of comprehension (Macnamara 1972).

Bloom's argument was based on a detailed study of her own daughter's early production of language. This was the first significant psycho-linguistic diary-study for three decades (cf. Leopold 1939). It was also new in making a systematic attempt to relate individual childhood utterances to their immediate context in such a way that the underlying meaning was made clear. These methodological innovations gave Bloom enough ammunition to expose the inadequacy of current 'pivot-grammar' accounts of child language development. A simple two-word utterance consisting of "Pivot + x-word" could code a number of important distinctions for the child. Thus "Mummy sock" coded such different semantic relations as agency (the mother putting a sock on the child) and possession (pointing to the mother's sock). Similarly, in terms of prosody and its non-verbal accompaniments, it might be uttered as a request, as a question or as a declaration. In the light of examples such as these, Bloom concluded that the form of early utterances was determined primarily by what children intended to talk about and not by syntactical rules.

A similar case was argued by Macnamara (1972) for comprehension. Taking the lexicon, syntax and phonology in turn he showed that, in order to resolve the many ambiguities in linguistic systems, the infant must be pre-equipped with cognitive strategies that function as shortcuts in the task of relating symbols to speakers' intentions. For example, he suggested that children could only learn a word such as 'and' after they had experienced a need for it in their own thinking. Similarly, for syntax, he argued that children would only be able to equate such grammatically different utterances as 'Give the book to me' and 'Give

me the book' on the basis of an appreciation that books can be given to people whereas people cannot be given to books. Macnamara's conclusion was that

"infants learn their language by first determining, independent of language, the meaning which a speaker intends to convey to them";

only then can they go on to work out the relationship between the meaning and the utterance they heard.

With the appearance of these critiques, it was not surprising that researchers began to ask more detailed questions about the nature of the infant's psychological preadaptations for communication. Macnamara suggested that the different forms of speech act (denial, request, declaration, question, etc.)

"probably correspond to deeply rooted mental attitudes of assertion, seeking for information, wishing to have others perform certain acts, etc."

And in an influential review-article, Ryan (1974) proposed that language acquisition is based on the establishment of intersubjectivity between adult and child, where 'intersubjectivity' consists in the mutual recognition of various complex forms of intention, as previously defined by the philosophers Grice, Austin and Strawson: for example, the speaker's intention that his audience should recognise his intention to produce a certain response in the audience. She went on to say that the major empirical problem in research on language development was

"of identifying and describing the kind of intentions involved and how the necessary mutual recognition develops".

The most sophisticated solution to this problem - which

has both a theoretical and a practical aspect - was that proposed by Colwyn Trevarthen (cf. Richards 1974a, Bruner 1975a,b, Schaffer 1977a).

Trevarthen's ~~practical~~ innovations were related to his use of film and TV (although he was not alone in this - e.g. Bullowa 1979b). This led to a massive increase in the observable detail of infant behaviour, which, in turn, allowed the description of a hitherto unsuspected complexity in the actions of young infants (viz. 'prespeech'). Film was already in use in other branches of psychology in the late '60s. But its introduction was particularly consequential in the study of infants because the majority of their movements are fleeting and small. It is for this reason that, until the middle of this century neonates were thought to be deaf at birth. Similarly, until the early '70s, their social equipment was thought to consist entirely of simple reflexes (Bowlby 1969). It is only with the use of film and video-tape that the formal organization of their facial expressions and indeed the temporal organization of all their behaviours has come finally and properly to notice. For this reason use of audio-visual technology is one of the major stimulating and unifying factors in current research on early sociability. (The methodological significance of this development is discussed more fully in Chapter 2).

^{Current}
^ Research on early social development is unified by ideas as well as methods. Thus contemporary researchers generally agree that infants' biological preadaptations to social life are extraordinarily complex and highly organised - both in themselves and in their temporal relation to the behaviour of the people with whom they interact. Much work has been done on these early dyadic regularities. Two forms are distinguished: interactional synchrony and systematic alternation

between partners or 'turn-taking' (e.g. Brazelton et.al. 1974, Stern et.al. 1975, Trevarthen et.al. 1975, Condon and Sander 1974, Snow 1977, Kaye 1977, Fogel 1977, Tronick et.al. 1979). In the course of the past decade many other discoveries have been made about early interactive behaviour - some of which have already been described (pp.14 -20 above), and others of which are used to support or question arguments in the empirical chapters below. Nevertheless, the psychological status of the infant's complex preadaptations to social life remains uncertain. This uncertainty is exacerbated by an apparent lack of agreement as to what constitutes a psychological finding. Many believe that psychological phenomena such as thoughts and feelings cannot be submitted to direct empirical investigation. This means that, although what infants do may be described in physical terms (e.g. of 'rate', 'speed', 'length', 'duration', 'combination'), it is seldom described in psychological terms (e.g. of 'motivation', 'thought', 'feeling', 'intention', 'meaning') - so that psychological topics receive mainly theoretical attention. This leads to a great diversity of opinion.

The onset of communication is one of the topics about which there is most speculation. Some claim that any appearance of motivation in the young infant's signalling is illusory and that shared meanings and intentions have to be "programmed into" babies before they can be said to communicate (Richards 1974b, Kaye 1979, Newson 1979). Some believe that communication grows - in unspecified ways - out of the successively more elaborate levels of interactive behaviours built on a basis of behavioural synchrony observable in mother-neonate pairs from the first week of life (Kaye 1977, Chappell and Sander 1979) or, alternatively, with the development of selective attention (Junker 1979). And some claim that communi-

cation cannot occur until certain cognitive developments have taken place - in particular the development of the "concept of dialogue" (which subsumes the concepts of intentionality and reciprocity; Bates Camioni and Volterra 1975, Schaffer 1977b). Others believe that, as well as beginning "extra-uterine life with a repertory of sophisticated behavioural mechanisms, [the infant] establishes a refined system of social communication directly with its mother and indirectly with society at large" (Wolff 1976, Brazelton 1979). And yet another group claim that communication either should not or cannot be studied in the early months of life (Plooij 1976, Bruner 1975a, Collis 1977).

What is striking in this diversity of opinion is that, unlike the consensus about the sophistication of the neonate's behavioural mechanisms, it is not based on exact observation but on impressions and ad hoc hypotheses. No-one has reported a project which goes beyond physical descriptions to give a rigorous analysis of the senses of infant and maternal movements - showing whether or not the infant's movements can justifiably be called communicative. When a decision is made as to whether or not an infant can communicate, it is made on theoretical grounds: for example, communication involves intentionality, intentionality does not develop until the end of the first year according to Piaget's theory, therefore infants younger than this cannot communicate (Bates, Camioni and Volterra 1975, Schaffer 1977b, see pp. 10-14 above).

The uncertainty produced by this a priori form of argument means that, even when researchers do discover behaviours which seem to have a comprehensible social sense, they are loath to give them any theoretical significance (e.g. Tronick et.al. 1979). The only exception to this statement is found in the work of Trevarthen.

Trevarthen's theoretical innovation was his application of psychobiological findings to infant development. These necessitated a conceptualisation of early infancy more sophisticated than the previous more abstract psychological and linguistic conceptualisations. Concentrating purely on the main facts of developmental biology - for example, the fact that the human body is completed in rudimentary form eight weeks after conception whereas it takes a further thirty-two weeks of development, mainly in the tissues of the cerebral hemispheres and cerebellum, before a human being is ready for birth - he concluded that the major functions of the human mind must be sketched out before birth (Trevarthen 1978). The anatomically distinct areas of the brain which, in adults, each regulate such distinct psychological functions as motor skill (cerebellum), perception, volition and memory (cerebral neocortex), language (Wernicke's area) and visual-spatial abilities (right hemisphere), are all distinguishable in the brains of neonates. It was still possible however that, although anatomically distinguishable, these areas of the brain remained largely inactive in young infants. For this reason Trevarthen began to analyse films of early behaviour, a venture he described as "behavioural embryology" (Trevarthen 1973).

Starting work in 1968, Trevarthen soon accumulated a substantial body of evidence that infants' brains were operating in a complex manner from the first moments of extra-uterine life onwards. For example, newborns minutes old make very well-ordered eye movements, indicating that their space-organizing cerebral processes endow them with an innate faculty for awareness of the spatial characteristic of the visual world (Trevarthen 1974, see also Bruner 1974). Similarly, neonates make embryonic reach-and-grasp movements toward objects. Although rarely successful, this 'pre-reaching' behaviour

shows that an innate faculty for motor coordination is also operative in early infancy (Trevarthen 1974 , Trevarthen et.al. 1975). But Trevarthen's most significant finding so far as linguists are concerned was his discovery that infants exhibit specific behavioural adaptations for communication including rudimentary efforts to speak and highly characteristic gesticulations of the arms and hands (pp.16-18 above). In conjunction with increasing evidence of infants' precocious sensitivity to persons and person-like stimuli, this suggested that - above and beyond the faculties so far described - infants must be born with a faculty specifically adapted to the recognition and control of cooperative intentions and joint patterns of awareness (Trevarthen 1974 , 1979a). It was the close similarity between his conclusions and Ryan's (1974) conclusions about the mental requirements for the early use of language which led Trevarthen to call this faculty a faculty of 'intersubjectivity'.

Since making this proposal Trevarthen has conducted concentrated research on the first year of life. He has found that intersubjectivity differentiates during this period, taking on three successive forms. The first distinguishable form he designates as "primary intersubjectivity" (Trevarthen 1979 a,c). This covers the first ten weeks, of which the first five are predominantly negative in social terms. Thus very young infants often react to the en face approaches of caretakers by looking away, curling up, fussing and sleeping behaviours (Stechler and Carpenter 1967). They may reject being spoken to, avoid eye-to-eye contact and struggle when picked up. And although they respond positively to holding, cuddling, rocking, etc., this appears to be because it permits them to shut out more complex engagements: their behaviour is "autistic"

(Mahler et.al. 1975).

At about four or five weeks of age there is a pronounced change in the social orientation of the infant and by six weeks highly responsive 'positive' responses are easily elicited. For example, smiling and visual attention come to be obviously and preferentially directed at caretakers and, in face-to-face interactions, six- or eight-week-olds are easily involved in complex interchanges of expression (Trevvarthen 1974 , 1979a). It might be expected that the complex positive response and interaction with the mother of two-month-olds would go on to develop quickly into even more complex forms of positive enjoyment. But, as Trevvarthen reports (1979c), this is not the case.

From approximately eleven weeks onwards "there are signs of a complex negative motivation towards intimate personal rapport" in babies' interactions with their caretakers (Trevvarthen 1979c). Thus, when approached and spoken to, the three-month-old may 'shut out' the interactant by looking down and concentrating gaze on the feet or hands. This period of renewed negativity is followed at around four months by the development of simple interpersonal games. Early games generally involve simple rhythmical noises on the part of the caretaker highlighted by physical contact (e.g. poking in the stomach, shaking the legs). Trevvarthen calls these 'person-person' games (Trevvarthen and Hubley 1978). Their appearance coincides with the appearance of infant laughter (Washburn 1929). Meanwhile the infant will have begun to show an increasing interest in objects (White Castle and Held 1964, Bower 1974). Around sixteen to twenty weeks attempts to reach and grasp objects start to be consistently successful. Improved prehension is reflected in the social sphere by the increasing popularity of person-object games



between five and six months: the child will begin to laugh more at objects animated by the mother than at the mother herself.

Once again one would expect this eager interest in games to lead to an increasing ability to relate to others and to cooperate with them. But, once again, the achievements of the second phase of intersubjective development appear to undergo a transformation, making games frustrating for the child and people threatening (Schaffer 1966). This third period of negativity ushers in a third phase of intersubjective development which lasts for the next six or seven months. Once again, an initial preoccupation with objects is resolved socially: in the emergence (at around ten months of age) of "truly cooperative activity" (Trevvarthen and Hubley 1978, Trevvarthen 1979b). It is this development which Trevvarthen believes to underlie - among other changes in cognition - an interest in the way adults make objects disappear (Piaget 1947); the use of vocalisations to refer to objects and events in the external world (Halliday 1975); spontaneous giving to others (cf. 'reparation' in Klein 1953b 1937) and willingness to be instructed - all of which first appear at approximately ten months of age.

Trevvarthen's publications outline a scheme of early social development which is more complex and more detailed than that of any other research worker in the area. As yet, it is too early to judge its validity. Nevertheless, certain comments can be made concerning both its empirical and theoretical bases.

In quantitative terms the evidence for Trevvarthen's developmental scheme is scanty. This is partly because most of the observational work currently being published is normative or records only isolated elements of the infant's social repertoire ('gaze',

'sucking', 'vocalization') which do not provide adequate evidence for the presence or absence of the sort of complex social actions about which Trevarthen writes. And although Trevarthen's own publications are rich in illustrations, he has as yet published only one systematic case-analysis of the first year of life (concentrating primarily on the second six months of life; Trevarthen and Hubley 1978). In this light, claims such as "infants show invariably a cooling of their interest in chatting with the mother" at four months of age (Trevarthen 1975, my emphasis) must be treated with caution. Nonetheless, Trevarthen's original claim - that there is an innate faculty of intersubjectivity which operates from birth - apparently has more substantial empirical support (but see pp. 55 - 56 below). First, there is evidence that babies as young as four weeks old can imitate movements of the face and hands (Maratos 1973, Meltzoff and Moore 1977). This suggests that infants have a cerebral representation of persons (Trevarthen 1979b). Secondly, Trevarthen reports a film study in which it was discovered that young infants "categorize unliving physical objects as different from living intelligent objects like their mothers and behave quite differently to these two kinds of thing" (Trevarthen 1974a). This suggests that babies have not only a repertoire of social behaviours but an idea of what these behaviours are appropriate for. He backs up this second finding with the observation that during mother-infant interactions there is, on the infant's behalf, "subtle modification to the form of her actions proving that the baby can perceive the mother's unique person-like attributes" (Trevarthen 1979c). Finally, if this sort of conversational exchange is perverted by the mother immobilising her face or behaving unresponsively, young babies will quickly become upset, sug-

gesting that they already know how people 'ought' to behave in such circumstances (Tatam 1974, Tronick et. al. 1975, Trevarthen 1979c, Murray in prep.).

Trevarthen's theoretical claims are unusual among those of psychologists in placing primary importance on interpersonal rather than cognitive development. Most psychologists believe that social development - and 'consequent' awareness of persons - is just one aspect of cognitive development (Piaget and Inhelder 1966, Schaffer 1971, Bower 1974). Trevarthen believes the opposite - putting forward the idea that there is an interactive competition between the development of object-oriented intelligence ('object-cognition') and the person-oriented intelligence ('intersubjectivity') by which it is dominated and regulated (Trevarthen 1975). With respect to the units of psychological development, he originally presented his work as "the natural history of intention" (1975). Very recently however he has suggested that motives are more fundamental; in particular the motives "to master objects in the environment and to obtain a community of motives with others" (1979c). He believes this substitution to be desirable because motives are relatively more enduring and less dependent on experience than intentions. (they are "the core of the subject's intrinsic mental organisation"). An additional advantage is that motives implicate a lower level of conscious conceptualisation on behalf of the subject than do intentions (e.g. Hampshire 1959). Thus, it rings truer to say that infants are motivated to communicate from birth than to say that they intend to communicate. Implicitly this is a criticism of the abstractness of Ryan's (1974) summary of the intersubjective requirements for language-use. It comes closer to Macnamara's (1972) suggestion that different forms of speech act - such as

denial and request - "correspond to deeply rooted mental attitudes ... which are innate or develop almost without benefit of learning". The closest parallel to Trevarthen's conception of motive is the psychoanalytic concept of instinct (i.e. "an innate biologically determined drive to action"; Rycroft 1968, cf. Trevarthen 1979b).

Both in the precocity of the psychological processes attributed to young babies and in the detail of the empirical claims made about early social development, Trevarthen's theory of intersubjectivity is more far-reaching than any other modern psychological treatment of young infants as social beings. Boldness combined with empirical specificity are, in Popperian (1972) terms, the two most important characteristics of the most refutable and (therefore) best scientific theories. As yet, empirical tests of Trevarthen's hypothesis are incomplete. The studies he quotes to show that one-month-olds selectively imitate movements of the mouth and hands (Maratos 1973, Meltzoff and Moore 1977) have recently been questioned on the grounds that neither controlled for increases in the frequency of these behaviours as an effect of generally increased arousal while also controlling for the alternative explanation that 'imitation' is a released response which can be elicited by a broad (but delimited) class of incentive stimuli (Jacobson 1979). The study by Trevarthen and Richards which is claimed to show that a group of young infants categorise inanimate objects as different from persons has never been published as such, although it is not infrequently referred to (e.g. Bruner 1968, Richards 1974, Trevarthen 1974). Neither are there in the literature any systematic presentations of adult-infant communication showing that infants recognise the specific significance (i.e. not just the

occurrence or non-occurrence) of others' social actions. The strongest experimental evidence for a faculty of intersubjectivity in early infancy is to be found in the studies which show that infants are upset by 'unnatural' perturbations of adult-infant interactions (e.g. Tatam 1974, Brazelton et.al. 1975, Tronick et.al. 1979, Murray 1980). But these studies do not show what role intersubjectivity plays in normal development.

The study of intersubjectivity poses special difficulties for the scientist. Thus in Chapters 2 and 4 of this thesis it is argued that no quantitative survey of infant behaviours can give satisfactory evidence for the existence of a faculty as sophisticated as the faculty of intersubjectivity is claimed to be, because 'motives' and 'the control of joint patterns of awareness' belong to a higher order of psychological phenomena than the order of motions - such as smiles, grimaces and gesticulations (Bernstein 1967, see pp.62-65 below). This argument raises an epistemological query about Popper's (1972: 342) belief that, in the progress of science by conjecture and refutation, it is observation which plays the decisive role, because, in order to observe or 'become aware of' patterns of awareness, epistemologists must assume the existence of what they are trying to question. Such an assumption need not trouble the scientific journeyman but, for the epistemologist, it raises a difficulty about the part played by assumptions in scientific endeavour. Popper suggests that assumptions receive their form from individuals' expectations and biological dispositions, which are, ultimately, of phylogenetic origin. Thus, in his terms, assumptions constitute 'subjective knowledge' - a less adequate order of knowledge than the truly scientific and specifically human order of 'objective knowledge' (i.e. linguistically formulated expectations submitted to logical criticism).

In the study of observable or quantifiable subject-matter, Popper's epistemological proposals can be accepted and the scientist can proceed. But the study of intersubjectivity disqualifies the student from being a scientist in Popper's terms, because intersubjectivity can only be studied 'subjectively'. Thus the researcher who believes that intersubjectivity - and other such phenomena - can be studied scientifically must propose that there is an order of knowledge more adequate than 'objective', 'linguistically formulated' knowledge. In fact this is a natural conclusion from the study of logic, - as Spinoza's (1910) philosophy and Lewis Carroll's (1904) allegory, "What the Tortoise said to Achilles", show. There is no logical argument that will enforce the acceptance of a logical argument, therefore there must be extra-logical criteria which determine the acceptance or non-acceptance of logical arguments. And, insofar as our knowledge of the world increases, these extra-logical criteria must, more often than not, accord with the structure of the world. These 'correct assumptions' or 'intuitions' constitute what Spinoza (1910 Pt.II prop.63) calls the third and most adequate order of knowledge, where the first and second orders roughly correspond to what Popper calls, respectively, subjective and objective.

In the light of this discussion it is interesting to note that there are two strands of intuitive reasoning which have received 'objective' support throughout this literature survey: namely, an emphasis on the active 'motivatedness' of young infants' actions and an emphasis on the importance of 'basic trust' for adequate social development (cf. Erikson 1950). Trevarthen's theory of intersubjectivity incorporates both these insights (e.g. motives are "the core of the subject's intrinsic mental organization";

1979a) - indeed, intersubjectivity might well be thought of as a formulation in theoretical terms of the psychological processes responsible for creating interpersonal trust. In these two respects, the theory of intersubjectivity is the true heir to the previously reviewed theories of development and its claims will be considered in detail in the first three empirical chapters of this thesis (Chapters 4, 5 and 6).

8. Implications of past research for the present study

Perhaps the most unequivocal conclusion to be drawn from the preceding sections of this chapter concerns the beneficial effects of increasing observational rigour in advancing our understanding of young infants as social beings. It was the advent of direct observation which marked the progression from Freud to Klein. It was the application of more rigorous ethological methods to social development which allowed the progression from Klein to Bowlby. It was the observational detail of Bloom's single case-study which introduced psycholinguists to the importance of infant development for language acquisition. And it was the introduction of film and video-technology which has permitted the current burgeoning of research in this field.

However, it will be remembered that in the introduction to this chapter, an argument was put forward that psychological research must do justice to both the constitutional and the societal aspects of social being if social development is to be understood (cf. Wrong 1961, Bell 1968 1971). While the advent of film and video-technology has led to much greater sophistication in our understanding of infants' social constitutions, it has tended to have the reverse effect on our understanding of societal influences on development. Thus,

as TV and film have become more important in developmental psychology, detailed observational research is more frequently conducted at the psychologist's place of work than in the home. This means that observations on social development take place more than ever in a "social vacuum" (Riley 1978). In the past, 'social influences' have been assessed by questionnaires and lists of categories. But as behavioural analyses concentrate more and more on the fine detail of interactional dynamics, these techniques have become inappropriate. More and more, the societally regulated parameters of social development (e.g. Newson and Newson 1965, Snow et.al. 1979) are left out of psychological accounts of early interactions.

This means that there is a pressing need for a means of representing adults' contributions to infant-adult interactions which does justice both to the behavioural detail of those contributions and to their connection with the adults' different positions in society. It is suggested in the following chapters that this need can best be met by the analysis of adults' 'babytalk' (see Chapters 5, 7 and 8).

Another important lack in the recent scientific literature dealing with social development is a treatment of negativity. The fact that young infants manifest complex negative social responses like ignoring, avoidance, anger, frustration and rejection is not infrequently mentioned in empirical studies (e.g. Brackbill 1958, Polak et.al. 1964, Stechler and Carpenter 1967, Ainsworth and Bell 1970). Yet modern psychologists reveal an odd restraint when it comes to discussing whether and how negativity plays a part in social development - usually treating it as a developmental aberration. The observations discussed in Chapter 7 suggest that this is an important oversight.

Despite the apparent diversity of theoretical statements about early social development, there does seem to be an empirical basis for a consensus on two central issues: the active, purposive role which infants play in relating to the external world - whether it be in the development of cognitive schemata (Schaffer 1971, Piaget 1973), in learning contingency relations (Papousek 1969) or in interpersonal interaction (Trevarthen et.al. 1975) - and, secondly, the importance of trust for adequate social development (see especially section 5). The only theoretical statements which provide a potentially acceptable account of these two characteristics of social development are to be found in Trevarthen's theory of intersubjectivity. For this reason, and because evidence for Trevarthen's formulation of the development of intersubjectivity is as yet scanty, it is his theory upon which we shall concentrate in the first three empirical chapters of this thesis (Chapters 4, 5 and 6).

One problem which emerges from reading the relevant psychological literature is the widespread absence from descriptions of early infant behaviour of the mention of infants' internal states as having psychological status (e.g. as 'moods' or 'emotions'). Psychologists generally only discuss internal states in physiological terms (e.g. 'arousal'). Yet many of the difficulties encountered in both childhood and adulthood are known to have important emotional aspects. It seems unlikely that the same is not true of infancy. While references to emotions - if not moods - are made in the psychoanalytic literature on infancy, observational studies have usually excluded them on methodological grounds (e.g. Hutt and Hutt 1970). As argued in the next chapter, this exclusion is no longer justifiable.

To summarise, the empirical chapters of this thesis

bear on three issues which have emerged from the foregoing literature survey - the validity of Trevarthen's theory of intersubjectivity as a description and explanation of social behaviour during the first six months of life, the role played by psychological 'states' in early interactions and the role played by social factors in infants' social development. The principal assumption made in studying these issues is that they can be studied with observational rigour. The next chapter presents a justification for making this assumption.

N.B. Two words - 'purposive' and 'intersubjectivity' - are frequently used in the following chapters of this thesis. Unless otherwise stated, 'purposive' is used as meaning "with purpose" or "directed towards an end" and 'intersubjectivity' is used to refer to expressions of a complex social sensitivity, that is, of a sensitivity to others' actions as having a comprehensible social significance. While intersubjectivity must involve the perception of others as purposive agents at some level, no assumption is made as to the degree of understanding of others' intentions such perception involves.

Chapter 2: METHODOLOGICAL CONSIDERATIONS

The previous chapter introduced the writer's concerns by means of an historical survey of research on social development. This chapter presents a rationale for the practical procedures used in collecting and interpreting the data on which the empirical chapters are based. The procedures themselves are described in the next chapter.

1. Motions and Actions

The units of analysis upon which the research concentrated were actions rather than motions. Actions are defined as 'the performances of deeds' where a 'deed' is something which is important to the individual who performed it (i.e. which is in the service of his or her motives). Actions are distinguished from motions - defined as 'physical changes of position'. The significant difference between actions and motions is that the nature of an action depends on its relation to a motive whereas the nature of a motion does not. On the other hand, motion is necessarily measurable whereas action is not. 'Behaviour' and 'movement' are used as generic terms to cover both motion and action.

This is a thesis on psychology, not on physiology or anatomy, and, while motions can be studied by both psychologists and physiologists, actions can only be studied psychologically and are, thus, the psycholo-

gist's true preserve. The importance of this point is made clear by the work of Nikolai Bernstein on "the coordination and regulation of movements" (1967).

Bernstein's research concentrates on analysis of the physiological coordination of such simple purposive actions as hammering, filing, striking piano keys and walking. In considering these actions he demonstrates that all the details of the constituent motions must be organised with the required degree of precision some time before the action is undertaken. In other words there exist in the central nervous system exact formulae (or 'engrams') which contain in some form of brain-trace the whole process of the action in its entire course in time. He then goes on to show that a one-to-one correspondence between the psychological features of central engrams and the details of the muscular motions they describe does not and cannot (mathematically) exist. For example, one can draw an aerial circle with the hand in different positions with equal ease and in response to the same instruction, but the circular movements made with the arm extended in different positions are accomplished by completely different innervational programmes. This illustrates

"that a determinate effect is possible for a movement only in a case where the central impulse is very different under different conditions, being a function of the positions and velocities of the limbs and operating very differently in the differential equation [describing the movement of the limbs] with various initial conditions ..."

In other words, purposive movements entail a variable relationship between physiological means and practical ends. This means that, in order to understand the physiology of particular movements, physiologists must take as their guiding principle the end to

which those movements are directed, that is, the motor problem as understood by the agent and his or her understanding of the result required for that problem's solution. And this, says Bernstein, "is a topic for psychological investigation".

Bernstein's work has significance for any work on infants where an attempt is made to conceptualise behaviour as a product or manifestation of physiological variations - variations in 'arousal' for example (e.g. Stern 1977). As Bernstein has shown, a one-to-one correspondence between cerebral 'engrams' and other somatic phenomena does not and cannot exist. To talk in purely physiological terms about infant behaviour is to leave out of account the most crucial level of explanation - the level of mental function. As one would expect from Bernstein's work, when variations in infant behaviour and in physiology are compared empirically, no clear relationship can be found to exist between these two classes of phenomena. For example, Ashton (1973) could find no equivalence between variations in the 'psychological' state of neonates before and after being fed (defined behaviourally) and physiological state, defined in terms of physical responsivity. Similarly, Sroufe and Waters (1977) were unable to find any systematic relationship between emotional changes (e.g. before and after seeing a fear-provoking stimulus) and variations in heart-rate. This is not surprising when one considers that attempts to define fear and hunger in terms of physiological indices leave out of account a central fact - that fear and hunger are primarily mental events and thus cannot be understood physiologically unless they are first submitted to psychological investigation.

Bernstein's work also bears on those observational studies of infant behaviour which pick out simple

physical movements from the gamut of ongoing action and study them in isolation: facial expressions such as the smile, the cry, head and eye movements, sucking and so on (e.g. Kaye 1977). Bernstein shows that such studies can throw no clear light on psychological processes, because there is never an unequivocal relationship between physical movements and the psychological actions of which they form part (excepting the special case of 'fixed action patterns'; Tinbergen 1951). Researchers must enquire beyond physical phenomena and understand the significance of infant movements in the light of the tasks they are trying to undertake. Thus our methodology must include not only systems of measuring and describing behaviours in physical terms but also a systematic way of determining their interpretive significance.

2. The Setting

One might claim that walking is a natural human act, but where one walks, when one walks and how one walks are intimately related with the social circumstances in which one is living. The human problems which are solved by motor action arise from the external environment. For this reason psychological studies of human action must take due account of the society in which those actions occur.

As noted by Schaffer (1977), there has been a tendency in developmental research to be more interested in hypothetical 'processes' than observable 'products'. For example, until recently, developmental psycholinguists almost all based their research on the formal properties of what children say and not its semantic content. Neglect of content allows researchers to circumvent the fact that when caretakers and children communicate there is always something particular at stake - the child is about to tumble down stairs; the

father is late for dinner; the child has just been sick. These issues arise 'naturally' from the social environment in which the family lives: they live in a flat so the baby does not know about stairs; the father has been switched to night-shift or has been caught up in a game of bezique at his club; the mother is hygienic but cannot find the tissues.

In modern developmental studies such factors as these are frequently neglected. Babies are usually studied in large anonymous groups from which unusual babies are excluded or in which their presence is systematically counterbalanced. Their behaviour is often recorded away from home at the researcher's place of work. Indeed it is considered methodologically desirable to ensure uniformity of external conditions so far as is possible: subjects are studied in the same room with the same toys and the same furniture in the same spatial configuration. Furthermore, uniformity of internal factors is also sought; babies are recorded in a uniform physiological/psychological 'state': well-fed, not tired and not fussy. Yet when it comes to theorising, psychologists often forget that none of the conditions under which psychological studies are generally conducted obtain generally in babies' everyday lives.

With this tradition in mind, the research reported in this thesis was conducted in a manner which differed from many other studies (see pp.73-77 for details) - although similar to those of such researchers as Kaye, Brazelton, Wolff, Trevarthen, Stern, Papousek and Richards.

3. Analysis

One of the peculiarities of past psychology has been its failure to develop an orthodox taxonomy. Taxonomy

is usually defined as the theory and practice of classifying entities (biological organisms, chemical compounds, physical elements, etc.) - a definition which implies that the collection of materials is distinct from their classification. Thus, for example, biologists build up archives of collected specimens to which they can refer if questions about classification are raised. Orthodox taxonomy is thus the product of an interplay between two distinct realms - the material realm of specimens and the linguistic realm of nomenclature - which are linked together by generally accepted procedures of interpretation. But until recently this process has been short-circuited in psychology: there has been no practical distinction between the collection and classification of behaviour: behaviour was not collected, it was transcribed, and it was transcribed in terms of pre-arranged linguistic categories, that is, a behavioural classification. This meant that questions such as whether 'failures to replicate' were just due to differences in interpretation or reflected genuinely different results could never be satisfactorily settled (e.g. Bower 1972, Dodwell DiFranco and Muir 1976).

However, with the growing availability of sophisticated audio-visual recorders, all this is changing. Psychologists are now in a position to undertake a natural history of human action in which data-collection is genuinely distinct from their classification. Indeed, moves are afoot to inaugurate a national archive of video-material which will provide a point of reference for future debates about classification (Maxwell Atkinson, pers.commn.). With this technological revolution in mind, an attempt was made to analyse the behavioural records reported in this thesis along orthodox taxonomic lines (e.g. Mayr 1969).

In working out how taxonomic principles should be applied in the analysis of human actions, help is to be derived from a study of law. The problems of forensic science and of psychological taxonomy are closely related. For hundreds of years lawyers have been developing methods for establishing whether or not claimed human actions really occurred and - if they did - for correctly interpreting them. As a result, law can make at least four sorts of contribution to the quest for a valid methodology in the human sciences:

(i) Theoretically; for example, the legal critique of the concept mens rea (the mental state associated with culpability) bears directly on the psychologist's concern with the possible interrelationships between action, emotion, motive and intention. This critique is particularly well-developed in legal discussions of recklessness and criminal negligence (e.g. Hall 1960).

(ii) Logistically; one of the principal features of law and legal theory is that it has to be practically oriented: there is at all times a well-defined procedure for the trying of cases, in terms of which legal problems are solved. Where the accepted methods of testing hypotheses in the physical sciences often lead to confusion in psychology (e.g. see Joynson 1974), the orderly nature of legal procedure serves as a clear alternative: the importance of establishing a prima facie case; the maintenance of a distinction between evidence and fact; the notion of having matters of which proof is not generally required (e.g. facts which must have happened according to the invariable course of nature, the meanings of common English words, the rules of logic), and of having features of proof which are generally but explicitly accepted (e.g. the

presumption of continuance: that things or circumstances, once proved to have existed in a certain state at a particular time, continue to exist in that state for a reasonable period thereafter); the notion of having explicit standards for the admissibility of evidence; the use of precedents and so on. An explicitly laid-out procedure for proof would be of considerable value in psychology where one often gets the impression that procedure is either manufactured on idiosyncratic, ad hoc bases or accepted wholesale with many methodological assumptions unexplicated.

(iii) Heuristically; law uses particular methods and specific principles of enquiry which are little known in psychology. Law could thus make substantive as well as procedural contributions to psychological method (e.g. the reasonable man test, the principle of co-occurrence, etc.).

(iv) Factually; legal cases provide evidence for the variety of human actions which would prove valuable in certain psychological studies.

Forensic procedure makes clear a more general point: the classification of human actions is necessarily uncertain: the most stringent standard of proof in law is proof 'beyond reasonable doubt', which, as Lord Denning (1947) has pointed out, does not mean 'beyond a shadow of doubt'. The more common standard of proof, the standard used in civil law and the standard which would seem most applicable in psychological research, is proof by establishing 'a preponderance of probability' in favour of one among a number of alternative constructions of a case.

Viewed in this light, psychology will never be more

than a form of advocacy. For instance, a scientist who claims that blacks are inherently less intelligent than whites (e.g. Eysenck 1971) is not reporting a finding about the world but is merely advocating this conclusion and marshalling evidence to support it. The same goes for the claim that infants are social beings at birth. This cannot be proved. It can only be advocated more or less convincingly (on the grounds of more or less empirical evidence).

4. Categories and Analytic Procedure

(a) Establishing a prima facie case.

The first phase of the film and tape analysis was conducted along traditional observational lines. Depending on the hypothesis at issue, a number of behavioural categories were defined and applied to the behavioural record (see Chapters 4 and 6). Another observer independently applied the same categories to a small proportion of the same data (of which there were more than fifteen hours) to assess inter-observer reliability. In taxonomic terms this phase is equivalent to initial 'identification' (Mayr 1969) - of 'negativity' for example. Subsequent analysis may prove initial identifications to be wrong (see below).

(b) Classification: a posteriori weighting.

Observational studies of human behaviour are often based on classification-schemes which are set up before the study is begun - usually by means of a pilot-study (e.g. Hutt and Hutt 1970, Blurton-Jones 1972). But to use these classification-schemes as a basis for the final classification of the behaviours observed, would be to be guilty of a priorism.

In biological taxonomy, the Aristotelians and their

successors often assigned a priori weights to certain characters. Cain (1959) has pointed out the fallacy of this approach. Neither function nor conspicuousness nor any other known aspects of a character gives it a priori a greater weighting than other characters. Indeed the very same structural difference may have high weight in one taxon and low weight in a related taxon (see Mayr 1969 Ch.6).

In the same way, to classify an action by means of descriptive categories which are fixed before the act is observed is to assume that movements which have been labelled as having a particular sense in the past are automatically to be given the same interpretation whenever they recur. But, as shown by Bernstein (1967), purposive actions are based on an alterable relationship between physiological means and practical ends: the same physical movement may have different psychological senses on different occasions.

The way this difficulty has been overcome in zoological and botanical taxonomy is by a posteriori weighting. The same method was adopted in this study. In contrast to initial identification, which is achieved by the application of a few a priori categories as described above, classifying taxa "means looking at the totality of characters as a single integrated ensemble, not at single, disconnected characters in an atomistic manner" (Mayr 1969: 76). This allows for the classification of unique or idiosyncratic actions as well as those which are more common.

Once initially identified, actions were then re-analysed on the video-tape (or film). This second analysis was much more detailed than the first and all forms of physical motion were considered to be potentially significant (see Chapters 5, 7 and 8). The 'taxonomic characters' employed were manifold - kinesic,

proxemic, vocal, facial, gestural, postural and visual - the most frequently used being facial (see Appendix 1).

The next chapter describes how the methodological principles discussed were put into practice.

Chapter 3: PROCEDURE

This chapter describes the procedures used to collect and analyse the data presented in the next five chapters.

1. Setting

In conformity with the argument put forward on pages 45-46 above, the research reported in this thesis was conducted in a manner which differed from many other studies. Behaviour was recorded on film and videotape in a laboratory setting. But no great effort was made to isolate the baby from the external world while her behaviour was being recorded. Voices were audible from adjoining rooms and, not infrequently, the experimenter or mother would enter the recording-chamber while recording was in progress - to adjust equipment, to wipe the baby's clothes and so on. Very often these interruptions produced interesting social reactions on behalf of the baby (see Chapter 5 Event 3 for example).

Neither were recording sessions necessarily discontinued if the baby began to cry. Babies seldom became very distressed in the laboratory although there was a fair amount of 'frustrated' crying. (If mothers did want to remove their babies from the baby-chair and comfort them they were encouraged to do so.) Even when not with the mother personally, the babies were

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always visible to their mothers, either through a window or via television, and could be taken from the chair at a moment's notice if need be.

The recording chamber was a square brightly furnished room (floor: 4m x 4m). In addition to normal room-lighting one 100-watt photoflood with a translucent shield was used for filming. The baby was secured in a specially designed baby-chair with a broad elastic waist-band. The chair supported the baby's trunk while allowing maximum movement of the arms and legs. In front of the baby sat the mother. Both baby and mother were filmed from the adjoining control-room through a plain glass window (1.1 x 0.75m): the mother's face being reflected by an appropriately angled front-silvered mirror. The control-room was kept in darkness during recording.

The height of the baby-chair was adjustable as was the angle at which the baby sat. The chair was adjusted so that the infant's eyes were approximately level with the mother's eyes when she was sitting on a normal chair and the baby's body was held at between 10 and 20 degrees to vertical depending on the maturity of the infant's postural control. When looking at the mother the infant would be facing approximately 20 degrees away from the camera (see Photo.47).

With one exception - who was recruited through friends - mothers were selected and contacted via health visitors (by whom they would be told that the experimenter was interested in early social development). If they wanted to participate, they and their baby would be brought by taxi to the lab at a time when they thought their child most likely to be alert and active. (This would be fixed at the last possible moment by telephone.) When recording began they would simply be asked to sit down in front of their baby and chat with

her (most of the subjects were girls). Any queries they had were honestly answered. The only restriction on their behaviour was against sitting in such a position as to obscure the baby from the camera. Each interaction lasted approximately five minutes. Each recording session, including breaks and cups of tea, lasted between half an hour and an hour.

It is recognised that the conditions in which data were collected for this research could be described as unnatural. Quite what the word 'natural' means with reference to babies is debatable. In at least one sense, the conditions of this research were natural in that the mother-baby dyad was hardly at all disrupted during recording sessions (no more than during washing-up for instance). Probably the most 'unnatural' thing was the presence of video-cameras - and these were more salient for the mothers than for the infants.

The argument that recording conditions are 'unnatural' usually leads on to the argument that 'unnaturalness' will infect the observed behaviour of the subjects and thus make findings inapplicable to everyday life. It must be said that this second argument depends on the assumption that 'everyday life' naturally lacks diversity. No-one who considers social inequalities or Western technological advances of the last decade, century or millenium can accept this assumption. The real question is: in what did the specific unusualness of these recording sessions consist so far as the mothers - and, thus, indirectly, their babies - were concerned?

Perhaps the most obvious effect was that mothers appeared to want their own and their babies' behaviour to reflect well on themselves. They wanted to impress the psychologist that they were good mothers, or, alternatively, they were worried that he would think

they were not good mothers. This wish might appear in a number of forms. The mother might simply want the child to show off its latest trick - such as a new-found ability to imitate 'raspberries'. The mother might be concerned that the baby should not disarrange their best clothes. Or, alternatively, she might become more authoritarian or cold-hearted with regard to her baby's crying if she thought the psychologist thought this was what a good mother should be. Quite often mothers would pass comment on their babies' behaviour in a manner suggesting 'detached' social judgement: "You're being cheeky", "You're just a rogue". But comments such as these form part of most mothers' repertoires - particularly when in the company of adult friends (into the category of which the experimenter attempted to insinuate himself!). The most striking observation was the range of moods mothers displayed whilst being recorded. One week they might play games with such gusto that, afterwards, they would seem slightly embarrassed when remembering they had been 'on the tele'. The next week they might be transparently bored, spending most of the recording session flicking looks into the mirror to see what was going on in the control-room behind them. In general mothers said that they enjoyed coming to the laboratory as their visits added interest to the job of child-minding which they had each taken on for the first time (i.e. ~~most~~ subjects were first-born).

No systematic evidence is available to suggest whether or not the interactions recorded in the laboratory were 'abnormal' with respect to the interactions in which mother and child participated at home. Informal home-visits and tape-recordings of interactions made by the mothers at home suggested that there is considerable variation in the extent to which mothers

talk to and play with their babies under normal conditions, and also in the intensity of those interactions. Some mothers would come into a recording session determined to show off a 'new game' which had obviously emerged in recent home-interactions of the type recorded in the laboratory. But other mothers never played this sort of game in the laboratory and I have no evidence that the babies of these mothers were involved in anything more intense than gentle babytalk during a feed or nappy-change, cuddling when distressed, and hearing a comment or two while sitting in their baby-chairs such as "Are you lookin' at the tele?", "Is that all the bright lights you see?".

As for the findings of the study, informal comments did suggest that some mothers - even some having no knowledge of our research - do encounter interactive phenomena corresponding to those recorded in the laboratory (especially early negativity). But, in the absence of systematic evidence as to the nature and frequency of adult-infant interactions at home, we can make no general statements about infant behaviour. We can only claim that the recordings reported in the following chapters show what babies can do under the laboratory conditions described above. On the other hand - in the same way that theoretical physicists are not put off from drawing theoretical conclusions as to the structure of the atom by the fact that atoms can only be split under specific conditions - the specificity of the conditions under which our findings about infants were made should not prevent us from drawing theoretical conclusions from these findings.

2. Analysis

(a) Initial identification: establishing a prima facie case.

The first phase of the film and tape analysis was, as stated on page 70, conducted along traditional observational lines. Depending on the hypothesis at issue, a number of behavioural categories were defined and applied to the behaviour. Another observer independently applied the same categories to a small proportion of the same data (of which there were more than fifteen hours) to assess inter-observer reliability. In taxonomic terms this phase is equivalent to initial 'identification' (Mayr 1969) - of 'negativity' for example. Subsequent analysis may prove initial identifications to be wrong (see 2b below).

Categories were of two sorts: referring to the simple incidence of a phenomenon (for example, smiling) and referring to the duration of a behavioural phenomenon. Inter-observer reliability was calculated in the same way for both sorts of category; by using the formula

$$Q = \frac{\text{No. of agreements (Observer A + Observer B)}}{(\text{No. of agreements (A+B)} + \text{No. seen by A only} + \text{No. seen by B only})}$$

(from McGrew 1972). Both observers coded the 'start' and 'finish' of each behaviour, thus proportion of overlap constituted 'agreement' as to duration and lack of overlap constituted 'disagreement'.

The three main categories were Smiling, Crying and Looking.

(i) Smiling is defined by Oster (1978) as a behaviour involving the action of zygomaticus major - a muscle which raises and draws out the corners of the mouth - in conjunction with an elevation and 'expansion' of the infra-orbital triangle (the cheeks), a pronounced deepening and straightening of the infraorbital furrow below the lower lids - changes produced by action of

orbicularis oculi. In line with this definition (which includes laughing), smiling was only recorded when an outward and upward motion of the lip corners coincided with raising of the cheeks and crinkling around the eyes.

Of the three major behavioural categories used in this study, smiling was the most difficult to code reliably. Different observers tended to disagree about smile-movements of low intensity. For this reason a policy was adopted of ignoring doubtful cases. This means that the quantity of smiling is if anything underestimated in this thesis - particularly during the early months when smiles are most ambiguous. [Inter-observer reliability: Duration = .84, Incidence = .78.]

(ii) Crying was defined as any negative vocalisation associated with a 'cry face' - the expression in which the lip corners are lowered and spread, the eyebrows are lowered and drawn together, the upper eyelids are lowered and the lower lids slightly raised and the lower lip projected in a 'pout' (Eibl-Eibesfeldt 1975; see Photo 61). A cry was counted as continuous if vocalisations were not separated by more than half a second.

Crying became more difficult to code with age, as the variety of the babies' negative vocalisations increased and became more idiosyncratic. It was for this reason that the 'cry-face' was included in the definition of crying. [Inter-observer reliability: Duration + .89, Incidence = .87.]

(iii) Looking was the most frequently used behavioural character of all. It was defined as a visual fixation of the other's face (N.B. not the other's eyes). Looks at or away from the face may be of two sorts - they may be glances which only involve eye-movement, or they may be looks involving both head

and eye movement. Disagreements as to coding mainly concern glances as these are usually quicker and less obvious than looks. During movements of the head and eyes, it was sometimes difficult to see at exactly which instant the eyes made or broke contact with the other's face. For this reason looks were timed from the end of the head-movement which first brought the eyes into contact with the other's face to the end of the head-movement which first took the eyes away from the face.

Looking became easier to code with age, as the infants developed greater postural control. Below two months of age, babies not infrequently adopted a 'defocussed stare' at their opposite number. In these cases, looking was coded in terms of head position alone. (Babies of this age can distinguish quite fine differences of pattern by using their peripheral vision; Maurer et.al. 1979). [Inter-observer reliability for babies: Duration = .93, Incidence = .82; for mothers: Duration = .89, Incidence = .89.]

The following behaviours were coded in terms of incidence alone.

(iv) Eyebrow Raise was defined as any appreciable movement by both brows upward from the modal eyebrow position. This definition excludes upward movements of the brows from an already raised position. [Inter-observer reliability: Incidence = .90.]

(v) Eyebrow Lower was defined as any appreciable movement lowering both brows from their modal position. This definition excludes downward movements of the brows from an already lowered position. [Inter-observer reliability: Incidence = .80.]

(vi) Tongue Protrusion was defined as any outward

movement of the tongue which made the tongue visible. This definition excludes those occasions when the tongue was already visible before it was protruded. This category was occasionally confounded by the next because the tongue was occasionally moved when the mouth was already wide open. However, most tongue protrusions were made with the mouth relatively closed, the tongue being hidden in shadow. [Inter-observer reliability: Incidence = .87.]

(vii) Mouth Open was defined as any movement of the lips creating a space of shadow between them. Because of the relatively harsh downward studio-lighting, this was a pronounced effect. However, the definition excluded any widening of the oral cavity from an already 'open' position because such movements, when small, were impossible to code reliably. [Inter-observer reliability: Incidence = .85.]

(viii) Yawning is a characteristic movement involving an involuntary wide opening of the mouth together with intake of breath and (relative) closing of the eyes.

[Inter-observer reliability:
Incidence = 1.00.]

(ix) Reaching proved a very difficult movement to code. It is defined by Bower (1972) as the infant's hand being raised sufficiently to cross a line midway between his body and the object being sought. As argued in Chapter 4, movements such as these become easily confused with gesticulations. Nevertheless Bower's definition of reaching was adhered to in the one experiment for which this measure was used.

[Inter-observer reliability: Incidence = .68.]

(x) Vocalisation was defined as any vocalisation not associated with a 'cry-face' (see (ii) above) and not including 'vegetative' sounds (Lenneberg et.al. 1965: burps, coughs, etc.). As with crying, vocalisations separated by less than half a second were

scored as continuous. [Inter-observer reliability: Incidence = .88.]

(xi) Hand movements were defined as any appreciable change of direction of hand movement. This definition includes the initiation of hand movements but not their cessation. Many hand movements were arcs - continuous changes of direction. However, in practice these were fairly easily distinguished from the more abrupt, decisive, angular changes of direction. Only the latter were scored as 'hand movements'. [Inter-observer reliability: Incidence = .91.]

(xii) Maternal utterances were defined as any word or group of words separated from preceding and succeeding utterances by a perceptible pause and united in terms of intonation and phrasing. When verbal, utterances universally coincided with sentences or reductions of sentences. When non-verbal, utterances were distinguished in terms of rhythm and phrasing - distinctions which were usually reinforced by differences in sound-content (e.g. Pa-pa-pa-pa-pa! Hey! Pgh-gh-gh! Hey, booboo!: 4 utterances). Utterances proved relatively easy to distinguish; their duration was more difficult to code reliably. [Inter-observer reliability: Incidence = .96, Duration = .70.]

The minimum number of incidents from which inter-observer reliability was calculated was 20. Duration was measured by means of a digital clock of which the display was recorded on video-tape simultaneously with the infants' behaviour (minimum unit = .01 seconds). Duration was calculated on films by counting frames (i.e. each frame interval = .04 seconds).

(b) Classification: a posteriori weighting.

Once initially identified, actions were then re-

analysed on the video-tape (or film). This second analysis was much more detailed than the first and all forms of physical motion were considered to be potentially significant (see Chapters 5, 7 and 8). Thus the 'taxonomic characters' employed were manifold - kinesic, vocal, gestural, postural and visual. Amongst these, the most frequently used were facial motions. (Appendix 1 contains a condensed account of Ekman and Friesen's (1975) system for analysing facial expressions as used in this thesis.)

The main problem with undertaking this second stage of analysis was in establishing inter-observer reliability for the classifications of actions which were finally reached. Because each analysis was essentially 'one-off', normal procedures for testing the reproducibility of analyses were inapplicable. For this reason, fairly long descriptions of the experimenter's reasoning for arriving at particular conclusions are presented. These descriptions are supported by photographs from the film or video-tape in question. By this means it is hoped that enough evidence is presented to provide grounds for the resolution of genuine disputes about interpretation. However, in every case, the ultimate point of reference is the original behavioural record.

An attempt was made to support one a posteriori analysis by more systematic experimental means. This is reported in detail in Chapter 5. More than fifty naive judges were exposed to seven photographic samples from a film of seventy seconds of mother-infant interaction. One-sentence descriptions of the seven events the photographs were supposed to portray were then matched by the judges with the photographs themselves. The results of this analysis showed that the judges were performing at a level significantly

better than chance - a level of performance comparable to that reported by Schlosberg (1941) and other workers for the independent judgement of adult facial expressions. Thus it was concluded that - in one case at least, - the experimenter's system of behavioural analysis and interpretation had an acceptable level of inter-observer reliability.

The next five chapters present and discuss the findings produced by the procedures for collecting and analysing data described in this chapter. Wherever specific sophistications of analytic technique are introduced - as in some analysis of maternal babytalk for example - these are discussed in the chapter concerned.

Trevarthen and Richards have never published this study as such. However a subsequent analysis of the same film has been published by Brazelton, Edelstein and Roth (1974). The film recorded the behaviour of five infants with their mothers and with a suspended luminous object at weekly intervals between the ages of two and twenty weeks. Brazelton et al.'s

"most striking observation was that there were two very different patterns of attentional behaviour present early in each infant, which were called upon in response to an object versus a familiar person. ... We felt that we could look at any segment of the infant's body and detect whether he was watching an object or interacting with his mother - as different was his attention, vocalising, smiling and motor behaviour with the inanimate stimulus as opposed to the mother".

Brazelton et al.'s conclusion closely coincides with

Chapter 4: EXPERIMENTAL EVIDENCE FOR INTERSUBJECTIVITY

As reported in Chapter 1, Trevarthen supports his claim that infants are born with a faculty for intersubjectivity by mentioning evidence from a film study that two-month-olds

"categorise unliving physical objects as different from living intelligent objects like their mothers and behave quite differently to these two kinds of thing". (Trevarthen 1974)

Trevarthen and Richards have never published this study as such. However a subsequent analysis of the same films has been published by Brazelton, Koslowski and Main (1974). The films recorded the behaviour of five infants with their mothers and with a suspended inanimate object at weekly intervals between the ages of two and twenty weeks. Brazelton et.al.'s

"most striking observation was that there were two very different patterns of attentional behaviour present early in each infant, which were called upon in response to an object versus a familiar person. ... We felt that we could look at any segment of the infant's body and detect whether he was watching an object or interacting with his mother - so different was his attention, vocalising, smiling and motor behaviour with the inanimate stimulus as opposed to the mother".

Brazelton et.al.'s conclusion clearly coincides with

Trevarthen's and contrasts sharply with Schaffer's (1971) contention that for young infants people

"do not constitute a class of stimuli distinct from the inanimate world"

as well as the interpretation presented by Piaget and Inhelder (1966). Nevertheless, Brazelton et.al.'s paper is not itself particularly conclusive, partly because the small number of subjects they used precludes statistically-based generalisations and partly because they present no substantive results to corroborate the story they tell. For this reason it was decided to preface the present study with an experimental test of the hypothesis that there are statistically significant differences in the behaviour that young infants direct towards people and the behaviour they direct towards things.

1. Procedure

(a) Subjects.

Eight mothers who had babies between nine and eleven weeks of age (average age: ten and a half weeks) were contacted through their health visitors. Six of the babies were first-born, two were second-born. Six were girls and two were boys. After an initial home-visit each mother brought their baby by taxi to the Department of Psychology at a time when they thought their child most likely to be alert and active.

(b) Treatments.

Once the infants had been settled in the baby chair (see Chapter 3 for details), their behaviour was recorded in two conditions: with their mothers and with a stimulus to elicit 'pre-reaching' (see below). In the 'mother' condition, the mother sat in a chair

face-to-face with her infant at about forty centimetres distance. She was asked to chat with and entertain her infant. This instruction gave rise to an animated facial display accompanied by a varied flow of baby-talk. Mothers were instructed not to touch their children on the face or body in order that direct evidence of their presence did not appear on the video-record during analysis of the infant's behaviour. (Mothers quite often circumvented this restriction by holding their babies' feet outside the camera's field). The video-camera was 'zoomed in' so that the image contained only a three-quarters view of the baby.

In the 'reaching' condition, the infants were confronted with a red wooden ball, 4.5 centimetres in diameter, moving slowly backwards and forwards towards them and across their field of vision at distances varying between 15 and 40 centimetres. (Their mothers watched from an adjoining room.) The ball dangled from a rod on a transparent nylon thread. The rod was held by the experimenter who stood as silently as possible behind the baby-chair. The ball was not moved evenly but in slow saccadic surges of between 10 and 15 centimetres. 'Fishing' movements such as these are the most efficient elicitors of 'pre-reaching' (Trevarthen 1977).

For four infants (randomly preassigned) the 'mother' condition preceded the 'reaching' condition; for the other four this order was reversed. Once the recording of a condition had started, approximately two minutes of behaviour was recorded, whatever that behaviour consisted of. (The average length was 127 seconds.) By this means the issue of what social behaviour is was not prejudged. However, as the infants were always in an alert and active state at the beginning of the 'two minute' session, the range of

behaviours possible was reduced - for example, no baby fell asleep during recording although some did grow drowsy towards the end.

(c) Behavioural measures.

Nine categories of behaviour were coded (Mouth Opens, Tongue Protrudes, Smile, Eyebrows Raise, Eyebrows Lower, Yawn, Reach, Duration of Looking, Incidence of Turning Away: see Chapter 2 for definitions). Vocalisation was not scored in order that the behaviour could be analysed in ignorance of which condition the babies were in (if the sound had been turned on, the mother's babytalk would have been audible).

These behavioural categories were selected from those used by Brazelton et.al. (1974), and in Trevarthen's work, to best differentiate between what Trevarthen and Richards distinguished as 'communicating with people' and 'doing with objects'. Thus MO and TP were chosen to represent prespeech, S, ER and EL to represent facial expressiveness, R to represent object-directed arm movements, DR and Y to express general level of interest and TA to represent what Brazelton et.al. call 'approach and withdrawal'. From Brazelton and Trevarthen's reports, object-directed activity is associated particularly with object-directed arm movements, intent visual regard of the subject, a lack of facial expressiveness, and a lack of prespeech. Communication is associated, on the other hand, with both facial and oral activity.

2. Results

The results do show statistically significant ($p \leq .05$) differences in infant behaviours between the two conditions (see Table 1).

These eight infants opened their mouths

more frequently when interacting with their mother than when interacting with a reachable ball ($p < .05$; Wilcoxon matched-pairs, signed-ranks test, two-tailed: Siegel 1956). They lowered their eyebrows significantly more often with their mothers than with the ball ($p < .01$; Wilcoxon). They also raised their eyebrows more often with their mothers than with the ball, a tendency which only narrowly failed to attain the .05 level of significance on the Wilcoxon (two-tailed) test. The length of time for which they looked at their mothers was not much different from the length of time for which they looked at the ball (averages: 100.4 secs at mother, 97.5 secs at ball). Neither was the frequency of reaching significantly greater in the 'reaching' condition than in the 'mother' condition. However, there was a trend in that direction. This trend may have been somewhat obscured by the significantly lower level of overall animation in the 'reaching' conditions (i.e. all movements summed in each condition for all babies $p < .02$; Wilcoxon). If the frequencies of the different movements are ranked for each baby, 'reaching' ranks lower in the 'reaching' than in the 'mother' condition for only one baby ($p = .11$; Sign Test, one-tailed).

3. Discussion and Conclusions

These results confirm the hypothesis that there are statistically significant differences in the behaviour that young infants direct towards people and the behaviour they direct toward things. They disconfirm Brazelton et al.'s (1974) stronger claim - that one can look at any aspect of an infant's behaviour and tell whether he or she is in the company of a person or with an object: all coded behaviours were manifested by some infants in both the 'reaching' and the 'mother' condition.

A possible criticism of this second conclusion is that not enough attention was paid during the experiment to getting the infants into the 'right mood' before recording began. Perhaps infant moods are not as quickly-changing as they would have had to be to have shown categorical behavioural differences between the 'reaching' and 'mother' conditions. If infants in a sociable mood had been tested only with their mothers and tests with the reaching-ball had been kept for when the infants, while being alert, were not in a sociable mood, it is possible that greater divergences in behaviour would have been recorded. Perhaps this experiment was over-crude in simply exposing infants to pre-assigned conditions whatever their mood - like forcing someone in the middle of their favourite television programme to go for a jog!

Further analysis of the results lends some support to this criticism. A Spearman's Rank Correlation Coefficient was calculated to see whether, - when the data for both conditions were taken as a whole, and the subjects were ranked with respect to the frequency with which they performed each of the nine coded actions, there were any consistent relationships between high-rankers and low-rankers for the different actions. As Table 2 shows, a fairly consistent pattern was found in which the orders of subjects ranked in terms of frequency of mouth-opening, tongue-protrusion, smiling, eyebrow-raising, and, less significantly, yawning were all positively inter-correlated. The order of ranks for this grouping (MO, TP, ER and S) - a grouping which might be called the manifestation of 'sociability' - was correlated negatively with respect to subjects as ordered with respect to duration of regard (DR) and with respect to eyebrow-lowering (EL). However, DR and EL did not form a second behaviour-grouping in

TABLE 4/2: Rank-order correlations between different actions for each baby taking the study as a whole

Infants' Actions	Infants' Actions							
	S	TP	ER	Y	TA	R	DR	EL
MO	<u>.79</u>	<u>.76</u>	<u>.76</u>	.31	.19	.43	<u>-.64</u>	-.45
S		<u>.71</u>	.38	.29	.36	.10	<u>-.57</u>	<u>-.69</u>
TP			<u>.72</u>	<u>.79</u>	.57	.10	<u>-.83</u>	-.30
ER				.48	.00	.29	<u>-.50</u>	-.24
Y					.62	.10	.48	-.10
TA						<u>-.10</u>	<u>-.24</u>	.10
R							<u>-.26</u>	.19
DR								<u>.07</u>

(Spearman Rank Correlation Coefficients with $p \leq .05$ underlined)

themselves: their coefficient of rank inter-correlation was only .07. Further analysis suggested that the pattern of correlations in Table 2 arose because certain infants remained in a 'sociable' mood throughout both recording sessions. That is, babies who raised their eyebrows, opened their mouths and stuck out their tongues most frequently at their mothers, tended to raise their eyebrows, open their mouths and stick their tongues out most frequently at the ball also. Thus, when individuals are ranked in order of the frequency with which they performed the coded behaviours for the 'object' and 'mother' conditions separately, the order of ranks for MO, ER and TP correlate positively with each other for the two conditions (see Table 3). Smiling in the 'object' condition correlates positively with MO, ER and TP in the 'mother' condition but not vice versa. This shows that babies who indulged in oral activity and eyebrow-raising more often than their fellows with their mother smiled at the ball more often than their fellows (but not vice versa).

To summarise, these new results suggest that there is a number of behaviours which are associated together in what might be called the manifestation of a 'sociable mood', but that infants do not adapt their mood particularly quickly to a change of situation. This provides a potential explanation for why the initial results did not reveal great differences in the behaviour infants directed towards objects and towards people. With this possibility in mind, a second study was done in which up to forty minutes of recording time was set aside for each of five babies. Each infant was exposed to the reaching-stimulus and their mother as many times as was necessary to obtain optimum one-hundred second samples of 'object-adapted' and 'person-adapted' action. Table 4 gives figures for the most

TABLE 4/3: Correlation of the ranked frequencies of different actions in each condition (for each baby) showing interpenetration of actions across conditions

Actions in 'mother' condition	Actions in 'object' condition								
	MO	TP	ER	S	Y	TA	R	DR	EL
MO	<u>.74</u>	.60	.55	<u>.81</u>	.00	.19	.45	-.50	-.38
TP	<u>.69</u>	.60	<u>.64</u>	<u>.71</u>	.21	.57	.05	-.43	-.36
ER	<u>.67</u>	.24	.33	.50	-.31	-.43	.45	-.07	-.31
S	-.07	-.14	-.29	.05	-.31	-.12	-.26	.05	<u>-.71</u>
Y	.57	.48	.38	.60	.19	<u>.67</u>	.48	.29	.10
TA	.07	.36	.17	.45	.21	<u>.90</u>	.07	-.36	.17
R	.33	.33	.33	.57	.19	-.19	<u>.95</u>	-.26	.33
DR	-.26	-.55	-.31	-.48	-.33	<u>-.98</u>	-.05	.55	-.10
EL	-.33	-.05	-.10	.19	.10	.10	.02	-.10	<u>.90</u>

(Spearman Rank Correlation Coefficients with $p \leq .05$ underlined)

TABLE 4/4: Scores for one infant (aged 9 weeks) showing maximum differences between 'mother' and 'object' conditions

Type of action	Condition	
	MOTHER	OBJECT
Mouth opens	38	7
Tongue protrudes	18	1
Smile	7	1
Eyebrows-raise	8	3
Eyebrows-lower	5	10
Yawns	0	0
Turn-away	11	12
Reaches	19	18
Duration regard	79.88s	28.59s
Vocalisation	23	5

contrasting samples recorded for any one baby. As can be seen, even under these more favourable conditions, a number of 'social' behaviours occurred in both conditions, as did 'reaching'. This suggests that babies do not make a categorical (behavioural) distinction between animate and inanimate objects under three months of age - as both Trevarthen (1974) and Brazelton et.al. (1974) claim. However, a possible alternative interpretation is that the categories of behaviour coded in this study were too crude or unnatural and that analysis with more refined functional behavioural categories would reveal all-or-none differences in infants' responses to social and physical entities.

Even if further work along the lines just indicated produced clear quantitative evidence, this would be unlikely to prove that young infants are social beings - for the methodological reason discussed in Chapter 2: that no human behaviour pattern can have an unambiguous psychological significance. For example, even the smile, which one would think is a social signal par excellence, is interpreted by Watson (1972) as an asocial response to the recognition of a fulfilled contingency-expectation. Similarly, oral activity (MO and TP) of the type described as prespeech by Trevarthen is interpreted by Polak, Emde and Spitz (1964) as related to feeding; eyebrow-raising (ER) has been related both to greeting (Eibl-Eibesfeldt 1975) and surprise (Ekman and Friesen 1975); eyebrow-lowering can be a product of concentration or displeasure (Oster 1978); TA can arise as 'cut-off' due to over-arousal (Chance 1962) or in searching for new stimuli to look at (Tronick and Clanton 1971); gaze (DR) can have a number of interpretations, from information-uptake to threat (Argyle and Cook 1976) and yawning (Y) may betoken both physiological and psychological tiredness

(boredom). Perhaps most important of all in this experiment, the category 'reaching' is ambiguous.

In the first place, it was found that none of the one hundred and twenty-three actions coded as 'reaching' in the main study reported here conformed to the stereotyped reach-and-grasp pattern described by Trevarthen et.al. (1975) which is

"closely comparable to the unconscious sequence of movements subscribed in the intention to reach for and pick up an object by an adult - at the climax of which the base of the index finger is aimed at the target, the climax occurring at the peak extension of the wrist or arm-and-wrist, a little under one second from the start of the movement".

The movements observed in this study were either amorphous or crude and abrupt. However, it is well-known that, between the ages of four and sixteen weeks, reaching is very difficult to elicit (Trevarthen 1974, Bower 1974). Trevarthen suggests that what happens during this period is not that infants lose interest in objects, but that, due to muscular and neural maturation, the way in which infants express their interest in objects changes. He suggests that early infant-reaching results from uncluttered exposure of a total pattern, combining distal and proximal motor systems, which is disrupted from months one to four by disproportionate growth of proximal motor systems and, thus, the infant's reaching attempts become cruder during this period; fist swipes taking the place of oriented grasps - a description subsequently corroborated by van Hofsten (1979).

This being the case one would still expect a higher frequency of hand and arm movement in the 'reaching' condition than in the 'mother' condition of the above experiment: and it was for this reason that 'reaching'

was defined broadly (see p. 81 above). The problem with the broad definition employed was that any type of arm extension was a potential candidate for inclusion in the 'reaching' category provided that it was in the direction of the stimulus. This means that the 'reaching' category included not only ostensibly object-directed swipes but also poorly formulated social gestures (see pp. 16 - 18 above). Thus 'reaching' formed an ambiguous category which makes it less surprising that no significant differences were found between the frequencies of reaching in the two contrasting experimental conditions.

Recognition of the interpretive ambiguity of purposive behaviour shows that the question whether or not infants are innately social beings cannot be settled by experimental quantifications of infant behaviour in different conditions. This experiment has confirmed what few people doubt: that infants behave differently with people and with things (unless the things are made to behave like people; Watson 1972). What remains doubtful is the interpretation of these differences. This leads on to the conclusion that the question whether or not young infants have a complex social sensitivity - as proposed in Trevarthen's theory of intersubjectivity - will only be answered by increased exactitude in both the observation and the interpretation of behaviour. The next chapter follows up this conclusion by describing a 'social' interchange between a mother and her nine-week-old daughter in enough detail to evaluate the relative merits of competing interpretations of the baby's behaviour.

Chapter 5: DESCRIPTIVE EVIDENCE
FOR INTERSUBJECTIVITY
WITH EXPERIMENTAL CORROBORATION

As noted in Chapter 1, Trevarthen offers more than one form of evidence for the existence of a complex social sensitivity to people (intersubjectivity) in infants. Perhaps the most important is that young infants respond, not to the atomistic motions adults make (e.g. the 'smile') but to the social significance of their actions (e.g. 'friendliness'; Trevarthen 1979c). However, neither he nor any of the other workers in this field (Brazelton, Stern, Fogel, Wolff), have ever presented systematically described specimens of infant social behaviour, showing them to constitute comprehending responses to actions by another person - actions which are themselves systematically shown to be the expressions of specific intentions or feelings. In other words, although he writes that

"infants in our films show many exceedingly sensitive and specific replies to the movements of their mothers. Expressions like smiles, surprise expressions or frowns produce immediate reactions. A smile may elicit a call or wave. Raised eyebrows may elicit a smile. Frowning may cause the expressions of surprise, fear or even sudden crying." (1979a),

he does not provide empirical information to show that infants' responses to these facial expressions are not

merely responses to different configurations of stimulus properties, as proposed, for example, by Kagan (1970), but are responses to expressions of an idiosyncratic personal consciousness.

It might seem that other research has resolved this issue. For instance, Wolff (1963 1969) reports that provided they are not fussy or sleepy, infants will smile at low whistles and the ringing of bells, and laugh at being tickled within the first two months of life. However, there seems nothing in Wolff's analyses to prevent one from considering these infant responses in the same light as the hungry herring-gull chick's response to the red spot on a piece of cardboard or his parent's bill (Tinbergen 1959) - that is, as something akin to a 'fixed action pattern'. This is because the social meaning of stimuli described as 'a low whistle' or 'a ringing bell' is not obvious enough for us to argue that the infants' responses to it are socially appropriate: in adult terms, 'a low whistle' is not unambiguously a joke or an obvious pleasure; one is therefore prepared to accept purportedly simple non-social explanations for the infants' smiling in these cases (see e.g. Watson 1972). Similar examples are to be found in Bower's work where infants are reported to show surprise, for example, to events which do seem inherently surprising (e.g. the discovery of objects which can be seen but not touched). But, although surprise is a social expression, the events which cause it do not appear to have a social meaning, because they are not the actions of another person (Bower 1974).

The most relevant work in the literature is that which shows young infants to be upset by odd social behaviour on behalf of the people with whom they are interacting. Thus Tatam (1974) reports that when two-month-old infants, interacting normally with their

mothers, see their mothers start interacting with an adult while still 'looking' at them (but in fact looking at the adult by way of a half-silvered mirror), they show tension and distress: facial expressions of surprise, yawning, grimacing and frowning, as well as gaze avoidance, crying, thrashing and struggling. Similar results are produced by asking mothers to stop reacting and freeze their expressions for a minute in the middle of a normal, happy exchange with their baby. (Brazelton et.al. 1975, Tronick et.al. 1979). Murray (1980) finds that the effects of these 'unnatural' interruptions in mother-infant interactions are different in quality from those caused by 'natural' or functional interruptions - when the mother briefly turns away from her infant to talk to a third party. Infants react less aggressively and with less surprise - often themselves turning to look at the intruder after a few seconds. Furthermore, when the mother re-engages the infant in conversation, the infant shows fewer signs of ambivalence and hesitation after a 'natural' interruption than after an 'unnatural' interruption.

This work suggests that infants expect their mothers to behave in a certain 'sociable' way when interacting with them. It also demonstrates that the reactions of infants to their mothers do have appropriate social meaning under some circumstances. Yet it remains possible that the infants' differential responsiveness in these experiments only reflects an understanding of the difference between 'natural' and 'unnatural' behaviour on behalf of those with whom they are 'interacting' and not an ability to understand significant differences within the realm of naturally-occurring social behaviours. For example, it might be that infants who become upset in these 'unnatural'

interactions are merely responding to the difference between coordinated and uncoordinated en face behaviour on behalf of their mothers (a difference to which their sensitivity is well known; Watson 1972, Murray 1980) and not to the fact that they have been rebuffed. The only procedure that can show infants are able to respond differentially to the senses of a whole range of different adult actions in the course of normal 'conversations' is a systematic fine-grain analysis of both infant and adult actions during such a conversation, demonstrating that the former are adapted to the significance of the latter. This chapter reports an attempt to produce such an analysis.

1. Method

a. Initial identification. An intersubjective exchange was sought containing high levels of prespeech and visual attention in the baby and varied social behaviour in the mother. A suitable stretch of interaction was found in films of a week-by-week pilot study of one mother-infant pair. It constituted the first seventy seconds of the second recording session, when the subject was nine weeks old. This exchange was subjected a posteriori to frame-by-frame analysis.

b. Analysis. In interpreting the significance of the mother's actions, particular attention was paid to four aspects of her behaviour.

(i) Babytalk. Some of the strongest evidence for particular interpretations of the mother's behaviour came from analysis of what she said. Her babytalk during the seventy-second period under discussion consisted of ten segments:

- 1 "Hello darling. Hello. Oo-oo-oo-oo! Hello. Hello."

- 2 "Are you going to have a talk today? Are you
going to have a talk? Are you? Oooh! Goin'
t' have a - ."
- 3 "Ahaha! Ahaha! You've had a busy day? You've
had a busy day? Yes you have. Yes you have.
You've had a busy day my darling."
- 4 "Hello. Bobedebop! Hello."
- 5 "Had a really busy day, eh? Had a busy day?"
- 6 "Hello. Hello Sarah."
- 7 "What do you see?"
- 8 "Boo-boo-boo!"
- 9 "Are we going to have a big talk about it? Oh
yes! Oh, we goin' to have a big talk about it,
are we? Goin' to have a big talk about it?"
- 10 "You're clever, aren't you. You're clever.
You're a clever girl. Yes you are. Yes you
are. You're very clever."
(70 second period ends.)

These groupings are distinguishable principally on the basis of changes in topic. Thus, out of the forty-two utterances listed above, twenty-one are straight repetitions or partial repetitions (entailing only grammatical variations) of the other utterances in their grouping; for example,

"You ()re a clever girl. Yes you are ().
You ()re () very clever ().", etc.

Exceptions, such as

"Are you? Oooh! Goin' t' have - ."

are generally contentless utterances included within a particular grouping because (a) they do not introduce a new topic into the babytalk, as, for example, the utterance

"You're clever aren't you."

would if it were included in grouping 9, and (b) because

they form only a single interjection between two otherwise related utterances: for example

"Hello. Bobedebop! Hello.".

Not all the lines of demarcation are easy to draw however. The most difficult is that between groupings 2 and 3. Although contentless lexically, the utterances

"Ahaha! Ahaha!"

are deemed to constitute the first utterances in content-grouping 3. This is because they appear to be a reaction to something the baby has just done in that they override the completion of the preceding utterance

"Goin' t' have - .".

And the following utterances, with which they are grouped,

"Ahaha! Ahaha! You've had a busy day? You've had a busy day?"

are consistent with the same interpretation: they appear to be an imaginative response to something the baby has just 'said'.

Transitions between content-groupings were interpreted as fairly deliberate attempts to adapt to the baby's mood, the type of adaptation being reflected in the words chosen. Thus, in the investigation of several events (nos. 1, 5 and 6), critical words were picked out for simple semantic analysis with help from the Shorter Oxford English Dictionary.

Content-groupings were also analysed with respect to the grammatical structure of the utterances which comprise them. Work reported by Sylvester-Bradley and Trevarthen (1978: 84) serves as an example. They suggested that certain grammatical transitions are responses to infant actions. The instance given in that discussion - dealing with the same mother-baby pair as in the present study - was:

"You're looking very pensive, aren't you. You're looking very pensive. Mmm. What are you doing? You don't want to smile. No. No."

Here there is a transition from a succession of questions and positive statements to a series of negative statements. It was argued that this transition was contingent upon an action of Sarah's which was conversationally appropriate and could thus be incorporated into the stream of speech interpreting the baby's mood: during the utterance,

"What are you doing?",

Sarah's head moved from side to side (and also, subsequently, during the mother's first utterance of "No"). That the mother picked up these slight movements as negative head-shakes was suggested by the emphatic head-shakes with which she accompanied her utterances immediately following it:

"You don't want to smile. No. No."

Other aspects of babytalk used as evidence for interpretations of maternal behaviour were changes in intonation and volume, in pauses between utterances, speed of delivery (in syllables/second) and length of

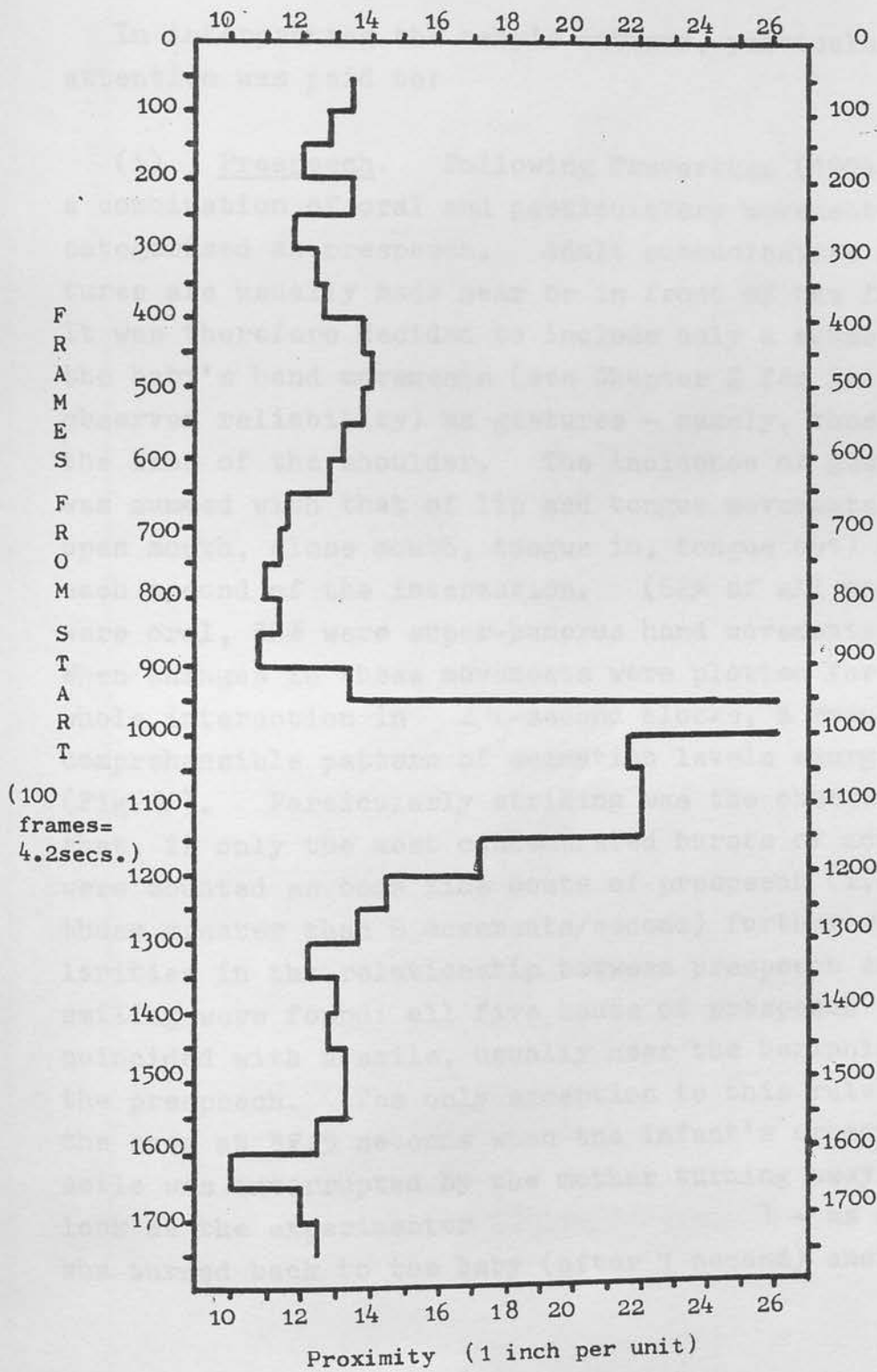
utterances in syllables and in seconds. Babytalk was described as 'normal' in volume and 'conversational' in intonation if it did not sound appreciably different from the mother's manner of speech in adult-adult interactions with the experimenter. (Divergences were coded only as 'decrease' or 'increase' in volume and pitch from this standard.)

(ii) Facial expressions were also an important source of evidence as to the mother's motives. The most frequently used facial movements were smiles and raising or lowering of the eyebrows. However reference was also made to Ekman and Friesen's (1975) system for categorising facial expressions (Appendix 1). Many types of facial movements seen during this interaction occurred only once (e.g. Event 1: the mother's mouth-shape; Event 6: the mother's 'extreme surprise'). Methods for determining inter-observer reliability were thus inapplicable. For this reason, some facial expressions used as evidence are supported by photographs to allow the reader to judge the validity of the interpretation being proposed.

(iii) Proximity. An important variable in dyadic interaction is proximity of the interactants to each other (Hall 1966). Most importantly, Argyle and Dean (1965) have shown proximity to be an index of intimacy (in an experimental situation). In this study, the distance of the mother from her baby was measured from a film-image every ten frames (.42 seconds) on an arbitrary scale (approximately 1 inch of real distance between mother and infant per unit). An average proximity for every fifty frames was then plotted on a graph (Fig.1). Changes in proximity were due to movements by the mother, as the baby was strapped to the baby chair.

(iv) The mother's gaze at the baby was almost

FIGURE 5/1 : Variations in the proximity of mother to baby with time.

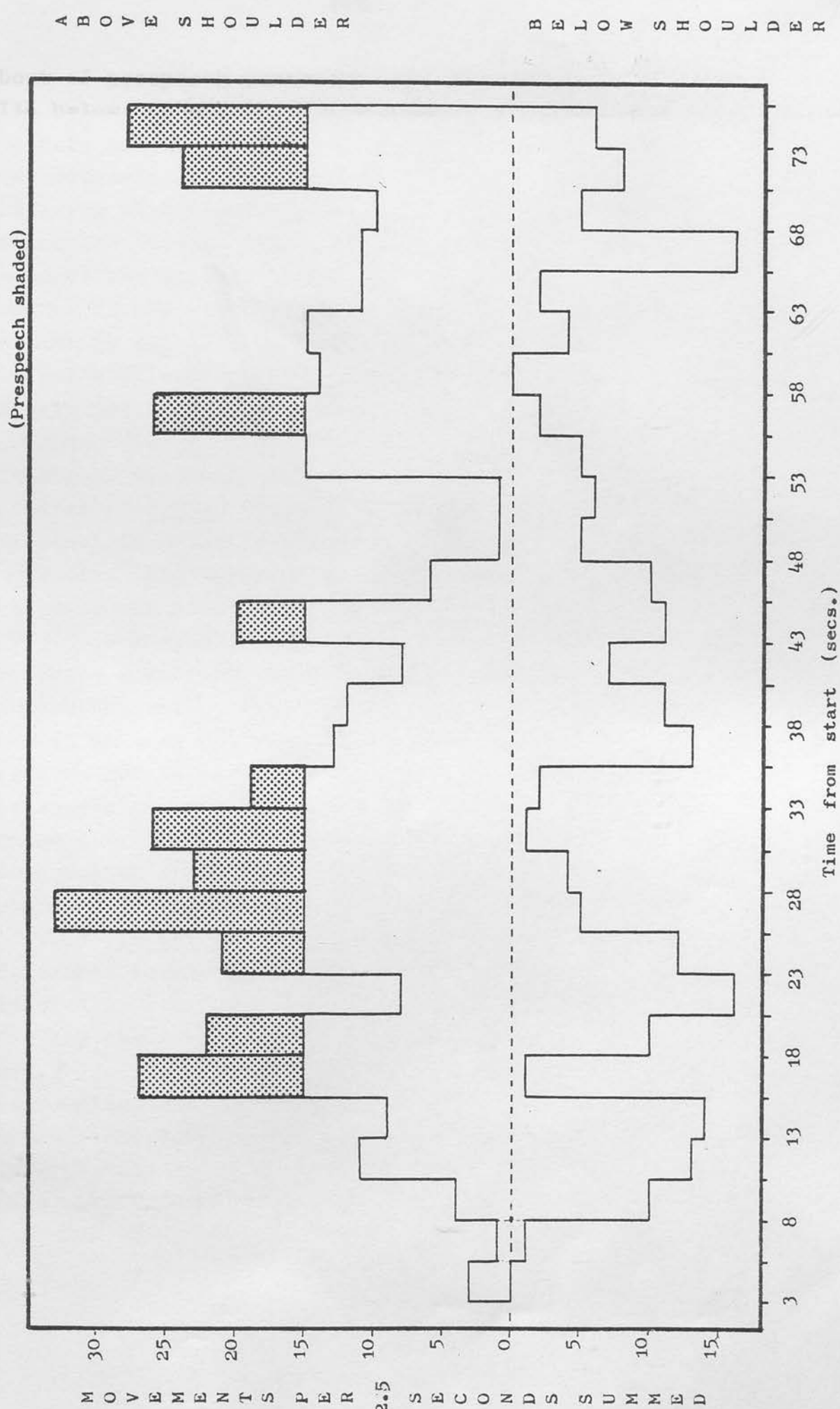


continuous. It was broken on only three occasions. These breaks are discussed in some detail as evidence for changes in the mother's motivation and intentions during the interaction.

In interpreting the baby's actions, particular attention was paid to:

(i) Prespeech. Following Trevarthen (1974 1979a), a combination of oral and gesticulatory movements was categorised as prespeech. Adult communicative gestures are usually made near or in front of the face. It was therefore decided to include only a subset of the baby's hand movements (see Chapter 2 for inter-observer reliability) as gestures - namely, those above the line of the shoulder. The incidence of gestures was summed with that of lip and tongue movements (i.e. open mouth, close mouth, tongue in, tongue out) for each second of the interaction. (62% of all movements were oral, 38% were super-humerus hand movements). When changes in these movements were plotted for the whole interaction in $2\frac{1}{2}$ -second blocks, a regular and comprehensible pattern of animation levels emerged (Fig. 2). Particularly striking was the observation that, if only the most concentrated bursts of activity were counted as bona fide bouts of prespeech (i.e. those greater than 6 movements/second) further regularities in the relationship between prespeech and smiling were found: all five bouts of prespeech coincided with a smile, usually near the beginning of the prespeech. The only exception to this rule was the case at 38.5 seconds when the infant's expected smile was interrupted by the mother turning away to look at the experimenter (p. 109) - as soon as she turned back to the baby (after 1 second) another

FIGURE 5/2 : Variations in the frequency of the infant's oral and manual movements with time, showing bouts of prespeech.

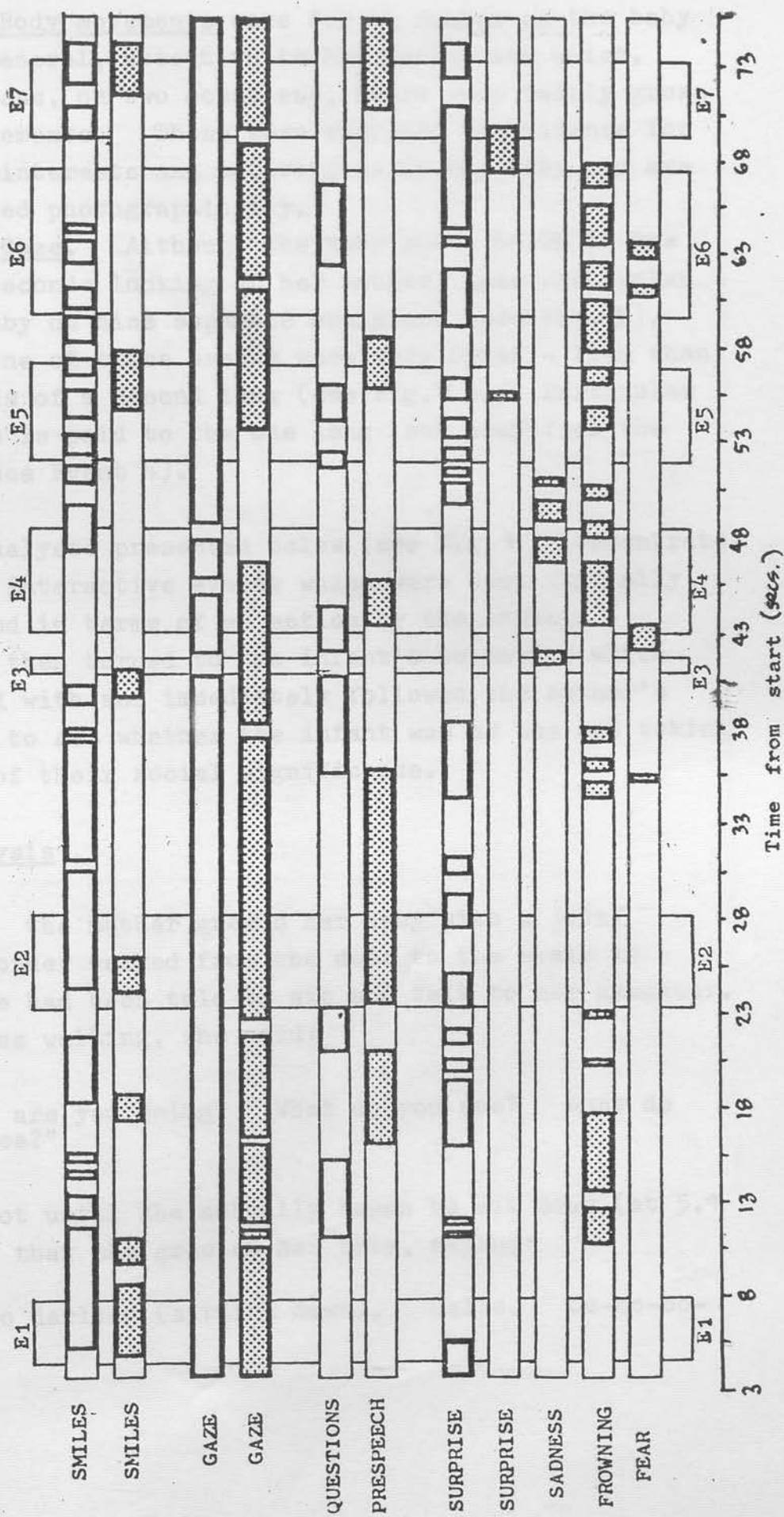


bout of prespeech commenced (see discussion of IA3 and IA4 below, pp. 127-141). Furthermore, it was interesting to note how these bouts of prespeech interlocked with the mother's questioning tone of voice (see Fig. 3). It seems that whenever Sarah's level of utterance-like animation dropped below its peak level (6 movements/second) the mother, sooner or later, started to question her as if she were trying to encourage Sarah to say something else; thus, questions only occurred in the infant's animation 'troughs'; a question from the mother always preceded a bout of prespeech, and, as soon as prespeech began, the mother stopped questioning. This is strong evidence that the animation-peaks, differentiated as prespeech proper, are indeed functionally distinct in interactive terms.

During this interaction, smiles at the mother were all preceded (within an average 2.0 seconds; range = .75 - 4.0 seconds) by Sarah looking away from her mother - something which occurred after every bout of prespeech, while, with the exception of Event 4, smiling was in no case followed by a period of looking away from mother before the end of the associated bout of prespeech (average smile-TA separation = 7.67 seconds; range = 3.25 - 14.67 seconds; see Fig. 3). This observation reinforces the impression that prespeech plays a systematic role in infant sociability.

(ii) Infant facial expressions were analysed by reference to Ekman and Friesen's (1975) system, as adapted by Oster and Ekman (1977) (see Appendix 1). The key elements were smiling and eyebrow movement (see Fig. 3). But, as with the mother, many of the movements discussed occurred only once so that the only appropriate form of corroborative evidence for interpretations of facial expression was photographic (see e.g. Photos. 1-6).

FIGURE 5/3 : Occurrence of mother's and infant's non-verbal behaviours during the interaction.



(iii) Body movements were few in number as the baby was, in general, attentive to her mother and quiet. Nevertheless, on two occasions, there were fairly gross trunk movements. These were analysed as evidence for changing interests and motivations in the baby and are illustrated photographically.

(iv) Gaze. Although the baby spent 86.2% of the seventy seconds looking at her mother, gaze was broken by the baby on nine separate occasions (see Fig. 3). All but one of these breaks were very brief - less than two-thirds of a second long (see Fig. 9). Particular attention is paid to the one long look away from the mother (see Event 4).

The analyses presented below (see Fig. 4) concentrate on seven interactive events which were each initially demarcated in terms of an action by the mother. Analysis then turned to the infant's behaviour which coincided with and immediately followed the mother's actions, to see whether the infant was or was not taking account of their social significance.

2. Analysis

Event 1: the mother greets her baby with a joke.

The mother walked from the door to the chair in which she had been told to sit and talk to her daughter. As she was walking, she said:

"What are you doing? What do you see? What do you see?"

It was not until she actually began to sit down (at 5.1 seconds) that she greeted her baby, saying:

"Hello darling (sitting down). Hello. Oo-oo-oo-oo!"

FIGURE 5/4: Summary description of seven events in a seventy-second interaction between a mother and her nine-week-old daughter Sarah

EVENT	DESCRIPTION
1	MA: the mother greets her baby with a joke IA: happiness in appreciation of her mother's humorous behaviour
2	MA: the mother listens with restrained amusement to her baby - as if the baby were telling her something IA: prespeech
3	MA: the mother, still conversing animatedly with Sarah, hears someone enter the room behind her and turns away from her baby to find out what is happening IA: distress
4	MA: the mother turns back to her baby without much animation or interest in interacting with her IA: rejection of the mother
5	MA: the mother suddenly becomes more animated, leans forward and teases her baby IA: pleasure in regaining conversation
6	MA: the mother begins to respond to her baby's actions in an exaggerated manner, as if enthusiastic to be interested in what the baby was 'saying' or doing IA: puzzlement and upset
7	MA: the mother drops her exaggerated manner and asks the baby a question - introducing a new topic of conversation IA: reinvolvement

Justification for This Interpretation

a. "Hello" is one of the commonest forms of salutation or address used in greeting. However, there are exceptions, particularly in the attempt to attract someone's attention. And a simple equation of "hello" with greeting is precluded by the fact that the mother says "hello" twenty-three times in the next 426 seconds of interaction, six of which fall in the seventy-second period under discussion. The majority of these "hello"s are spoken when Sarah appears to be 'acting deaf', either by not paying attention to what her mother is doing - by not looking at her for example - or when she appears to be acting non-contingently with respect to her mother's actions (cf. Murray in prep.). It seems likely that the mother says "hello" in these circumstances in order to re-engage the attention of her baby rather than to greet her. "Hello"s also occur at the ends of the infant's periods of inattention. These do constitute a form of 'greeting on arrival'.

In the case under discussion, it is unlikely that "hello" was uttered purely as part of an attempt to attract the baby's attention, as Sarah looked at her mother almost as soon as the latter entered the room - before she said "Hello darling", etc.

b. Evidence that the mother's action constituted a greeting can also be drawn from its context. The baby had been sitting on her own for approximately two minutes while her mother was in an adjoining room, receiving instructions. Thus, the mother's entrance to the room constitutes a reunion - and greetings mark reunions. Furthermore, greetings occur at the beginnings of interactions, and this act occurs in the first few seconds of the mother's interaction with her baby.

The mother does not say "hello" as soon as she

enters the room, but this is probably explained by the fact that Sarah questions:

"What are you doing? What do you see? What do you see?"

are the mother's response to the fact that her baby is not looking at her as she enters the room and, thus, serve principally to attract Sarah's attention. The words

"Hello darling. Hello.", etc.

are an immediate response to Sarah looking at her mother, an act which preceded them by .46 seconds.

c. If the mother's act were intended as a greeting, one would expect the mother to be concerned about her daughter's response to it in a characteristic way - to receive that response in a different way from the way she would have received her daughter's subsequent actions if she were simply intending to 'get through' to her baby for example. In this respect Event 1 contrasts with Event 5: as a result of both, Sarah looks at her mother, then smiles at her. But whereas in Event 5 - which is interpreted as an attempt by the mother to 'get through' to the baby (see below) - both Sarah's look and her smile are followed by the mother asking a question; in Event 1 look and smile are followed by the mother saying "hello":

"What are you doing? What do you see? What do you see?" (Sarah looks at her.) "Hello darling. Hello. Oo-oo-oo-oo!" (Sarah smiles at her.) (Mother begins to laugh.) "Hello. Hello."

Only after these repeated greetings does the mother go on to ask Sarah questions:

"Are you going to have a talk today? Are you going to have a talk? Are you?", etc.

The fact that she repeats "hello" both when Sarah looks at her and when Sarah smiles at her and the fact that, when Sarah smiles at her, she laughs, displaying a change in facial expression which fulfils all Ekman and Friesen's (1975) (see Appendix 1, Photos. 3-6) criteria for happiness, is completely consistent with the interpretation of this maternal act as greeting.

d. Given that the utterance "Oo-oo-oo-oo!" took place in the midst of a greeting, it is unlikely to be simply a neutral 'filler' utterance because, if the mother's intention is to greet her baby, she is not likely to forego it half way simply to utter something irrelevant. Thus, any interpretation of "Oo-oo-oo-oo!" must be consistent with the intention to greet. Joking appears, therefore, to be the only obvious interpretation of this utterance. (A joke is defined as "something said or done to excite laughter or amusement" in the S.O.E.D.).

e. There is suggestive evidence from the exact form of the mother's mouth-shape as she utters "Oo-oo-oo-oo!" that she is imitating a slightly vacant look which Sarah has as the mother enters the room. In this way, the utterance, as a joke, would consist of a gentle form of ridicule. The utterance is also associated with slightly raised eyebrows ('questioning') which are lowered as the mother sees her joke has been successful and smiles (see Photo. 2).

PHOTOS. 1-2 : Interactants' expressions at the start of Event 1.
PHOTOS. 3-6 : Subsequent transformation of Sarah's expression.

1



2



3



6

The Infant's Behaviour: The infant's actions accompanying and succeeding her mother's greeting can be summarised as a display of happiness in appreciation of her mother's humorous behaviour.

Justification for This Interpretation

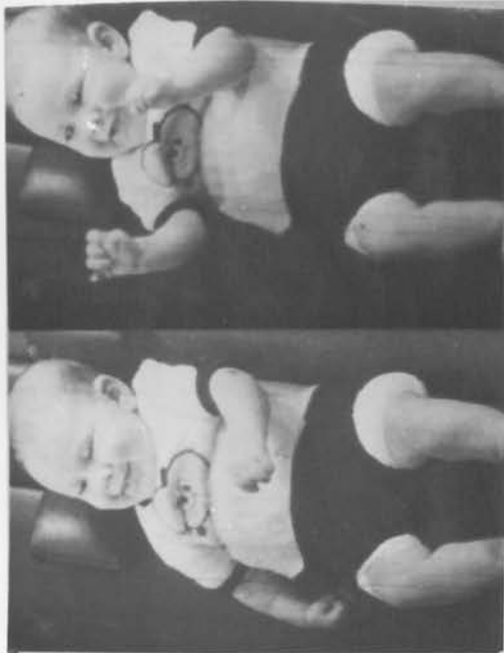
a. The main evidence supporting this description comes from analysis of the baby's facial expression: 6.42 seconds after the mother entered the room, the baby directed a smile at her which was longer and purer than any other smile during the interaction. It was also a broad smile and was maintained as a broad smile for longer than any other smile during the interaction. That the smile was considerably longer than other smiles during the interaction can be seen from Fig. 5. The smile lasted 6.33 seconds; the next longest were 3.42, 2.92 and 1.71 seconds respectively. By saying that this was a 'purer' smile than the rest I mean that, in Ekman and Friesen's (1975) terms it was not only broad but not a blend of different 'primary' emotional expressions. Sarah's expression was a pure expression of happiness.

If photographs of this smile and the other smiles are taken at their points of greatest broadness it can be seen that the latter incorporate the action of other muscle units than those described by Ekman and Friesen for 'happiness' (see Photos. 6-12). It is for this reason that this smile is interpreted as an expression of unalloyed happiness. It occurred, moreover, at the time at which the baby was least animated in terms of arm and mouth movement (see Fig. 2).

b. It is only after her mother has walked towards Sarah, sat down, said "Hello" and then leant forward to make her joke that Sarah begins to smile (i.e. the smile begins at Frame 18; "Oo-oo-oo-oo" lasts from Frames 0-42). This suggests that Sarah's smile is not simply

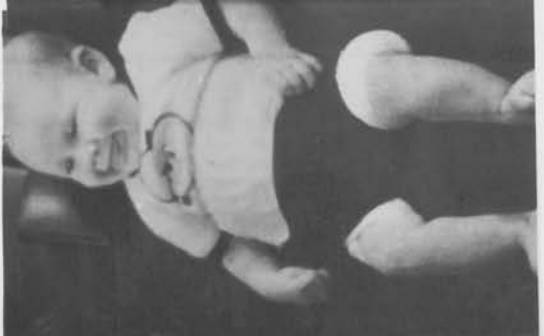
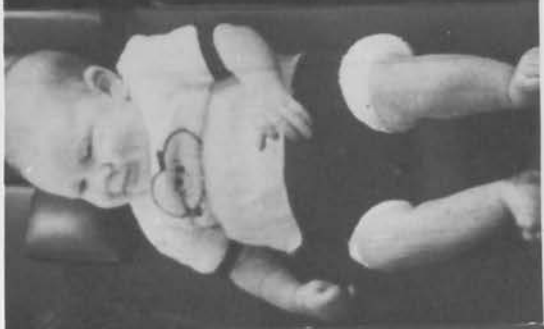
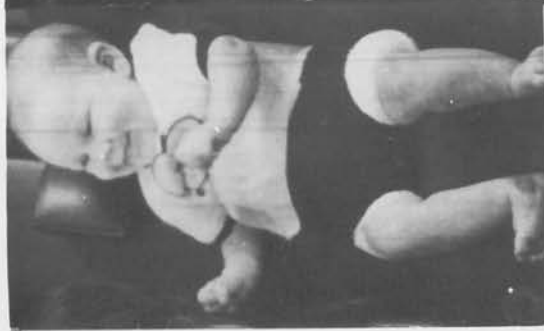
PHOTOS. 7-12 : Sarah's other smiles during the interaction ; to be compared with Photos. 3-6.

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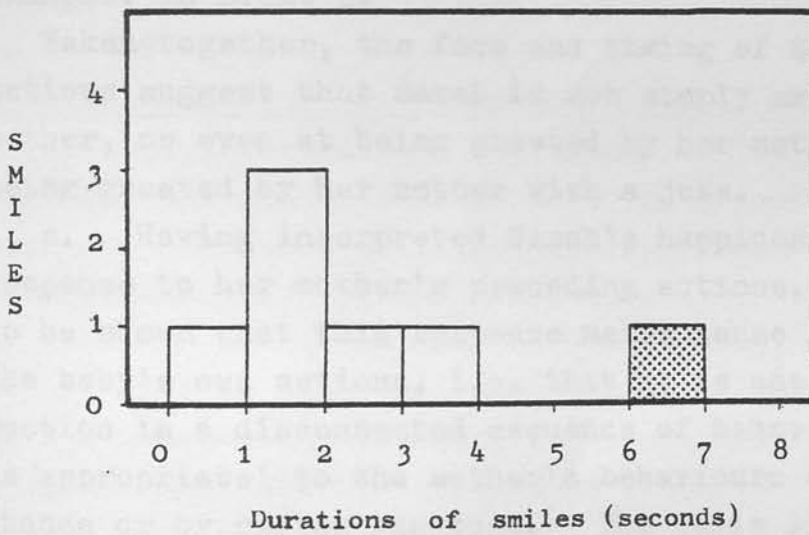
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FIGURE 5/5 : The durations of Sarah's smiles



(IA1 shaded)

a response to 'mother's face' or 'mother talking' (although it could be a response to these plus increasing proximity). One criterion for true communication laid down by Mackay (1972) is that interactants must not only perceive their partners as 'visible structures' but as 'goal-directed agents'. The details of this exchange give evidence that Sarah does fulfil this criterion for communication. Thus, if her smile were simply a response to the stimulus of seeing the 'visible structure' of her mother, one would not expect a time-lag of over six seconds between the mother's appearance and Sarah's smile. The slow response cannot be due to an inability to respond more quickly, as is shown, for example, in Event 3.

Taken together, the form and timing of Sarah's actions suggest that Sarah is not simply smiling at her mother, or even at being greeted by her mother, but at being greeted by her mother with a joke.

c. Having interpreted Sarah's happiness as a response to her mother's preceding actions, it remains to be shown that this response makes sense in terms of the baby's own actions, i.e. that it is not simply one section in a disconnected sequence of behaviours which is 'appropriate' to the mother's behaviours only by chance or by reflex response. The smile in question was preceded by visual fixation and scrutiny of the mother's face, accompanied by an impassive facial expression (see Photo. 1).

The sudden transformation of expression achieved by smiling has been described in detail by Harriet Oster (1978) - and it is interpretable as a switch from seeing the mother as an object to be looked at (a 'visible structure'; Mackay 1972) to recognising her as an agent, as someone with whom to interact. This is an experience which many adults acknowledge - for example,

when, while one is absent-mindedly musing over something unusual in a stranger's face, the stranger looks up and smiles (Sartre 1958: 252-302). In short, there is comprehensible continuity in interpersonal terms between Sarah's response to her mother's joke and her preceding actions.

Similarly there is a clear relationship between this response and the actions which follow it: the baby begins to make prespeech movements and gestures - i.e. having been greeted by and greeted her mother she begins to 'talk' to her.

Event 2: the mother listens with restrained amusement to her baby - as if the baby were telling her something.

Justification for This Interpretation

Sylvester-Bradley and Trevarthen (1978) suggested that certain grammatical transitions in maternal baby-talk are responses to infant actions which are conversationally appropriate (see pp. 104-105 above). As examples of communicative behaviour were being sought in this study, it seemed appropriate to locate such a grammatical transition in the babytalk which followed the mother's initial greeting in this interaction - preferably, a transition which suggested that the mother had obtained an answer having asked a question.

Grammatical transitions of the type being sought occur within content-groupings. The first such transition during this interaction occurred after 28 seconds:

"You've had a busy day? You've had a busy day? *
 Yes you have. Yes you have. Yes you have.
You've had a busy day my darling."

Here, there is a transition from questions to a series of affirmative statements. This suggests that Sarah has reacted to the mother's conversational gambits with an appropriate 'conversational' response during the transition marked *. The utterance "Yes you have" was deemed to be the beginning of Event 2.

a. Although the utterances "You've had a busy day? You've had a busy day?" are not questions by syntactic criteria (i.e. inversion of subject-verb order), they were both delivered at a relatively high pitch compared with the mother's utterances, and, with a rising intonation. They were also delivered with what Ekman and Friesen (1975: 39) call a questioning facial expression, that is, with a "surprise-brow" (see Photo. 13, Appendix 1). This facial expression was held in place during both the questioning utterances (3.17 seconds).

b. The fact that the utterances "Yes you have. Yes you have." are not questions does not differentiate them from their predecessors. However, they were not delivered at a high pitch, and they were not delivered with a rising intonation but with a descending intonation. This contrasts with the previous utterances. Furthermore, there was a marked change in the mother's facial expression at this point of the interaction (see Fig. 32): the questioning expression which had been held in place for the preceding utterances is replaced by a very different, happy expression simultaneously with the proposed grammatical transition.

None of the features involved in this change of expression (see Appendix 1) had changed for 2.82 seconds; they all change at the transition-point under discussion, and are subsequently held in place for 6.25 seconds. In addition to these facial changes, the mother simultaneously changed her posture from a

PHOTO. 13 : Interactants' expressions at the start of Event 2.

PHOTOS. 14-17 : Sarah's subsequent prespeech.



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forward position, which she held for 3.33 seconds, she moved her head back 2.2 distance units (see Fig. 1) to a position held for the next .83 seconds. This observation offers incidental support for the notion that the mother is changing from a more dominant, interrogating role to a more receptive, listening role at this point.

c. How can the mother's utterances, "Yes you have. Yes you have. Yes you have.", be described as the mother listening to her baby, 'as if the baby were telling her something'?

In adult conversations, listening and speaking are normally incompatible. However, there are some occasions on which one adult will speak in order to demonstrate her or his understanding of someone, or, to help the person to whom she or he is listening. This phenomenon is called 'predictive monitoring' by Fergusson (1975). It has been suggested elsewhere that much maternal babytalk in the early months must be seen as predictive monitoring or 'mirroring'; it is the mother's way of developing and expressing her comprehension of her infant's actions (Sylvester-Bradley and Trevarthen 1978). Thus, statements of agreement, such as "Yes you have. Yes you have." do suggest that the mother understands her baby to be expressing something - something with which she is agreeing and, therefore, to which she is 'listening' - although in a more active way than is usual in adult-adult conversations where semantic content is attended to (N.B. the mother's talk does not interfere with 'hearing' what the baby is 'saying' because the baby's equivalent of 'speech' is a visible expression).

d. Is the mother's action genuinely conversational?

Babytalk does appear to be conversational even though it does not form part of a genuine conversation.

This impression is corroborated by the work of Snow (1976). Snow has demonstrated that maternal babytalk can be adequately described as conversational using the model developed by Sacks, Schegloff and Jefferson (1974) for the description of conversations between adults.

The Infant's Behaviour: The infant's actions accompanying and succeeding her mother's 'listening' can best be described as prespeech.

Justification for This Interpretation

a. During this interaction, the most sustained and most animated bout of prespeech - as defined by the previously described indices (see p.108) - was the one immediately succeeding the transition from question to statement discussed above. (see Fig. 2 , Photos. 14 -17). This seems good evidence that Sarah behaved as if she were trying to speak at this point of the interaction (i.e. to reply appropriately).

b. This is one event during the interaction in which the infant appears to take the initiative and the mother to adopt a more receptive role. (It is not impossible however that the infant's action is, in part, a response to the questioning quality of the mother's action.) So, whereas in the previous case of 'greeting' it was shown that Sarah had responded to her mother's action appropriately, in this case it is necessary to show that the mother's response to the infant's actions as conversational is appropriate - that the infant's actions are 'conversational'.

To argue - as does Trevarthen for example (see 1979a) - that these prespeech movements are conversation-like because they occur in the right context would here be circular. We must rely on the more general claims that, in the first place, photographs of prespeech

movements look similar to photographs of adults speaking (Trevvarthen 1979); secondly, that the fine complexity of the movements and their association with animated face-level arm movements militates against simpler alternative explanations of them - as "bottle-movements" for example (Polak, Emde and Spitz 1964); and thirdly, that they have been observed in a number of babies of the same age as Sarah while these are interacting in an homologous conversational setting (see Chapter 1).

c. As with the preceding event, the infant's actions here appear to make sense in sequence with the actions which precede and succeed it. Thus a change from being fairly passive (see Fig. 2) and looking glum (see Photo. 1) to smiling and 'talking' is comprehensible on analogy with adult conversations, in which it is natural for bouts of relative passive inexpressivity (listening) to alternate with bouts of animated activity (talking) (see Kendon 1972, Sacks and Schegloff 1972, Brazelton et.al. 1974, Trevvarthen et.al. 1976, Kaye 1977).

Event 3: the mother, still conversing animatedly with Sarah, hears someone enter the room behind her and turns away from her baby to find out what is happening. (Time: 41.1 seconds)

Justification for This Interpretation

In some senses, this description is unequivocal. There is no doubt that after 38.4 seconds the experimenter audibly entered the room in which the mother was sitting, through a doorway which she could not see, and that almost immediately she turned from her baby to look in his direction. The only real questions are:

- (i) that her intention in turning to look at the

experimenter was "to find out what was happening" and not, for instance, because she was bored, or because there was something troubling her about which she wanted to ask the experimenter.

(ii) whether she was "still conversing animatedly" right up to the point at which she turned away from her daughter.

(i) With respect to the first issue, the following evidence is relevant:

a. that she looked in the experimenter's direction for only .60 seconds

b. that she did not speak to or smile at the experimenter (who was adjusting a photographic light), which was unusual, judging from other similar occurrences.

Both a. and b. militate against boredom - in which case she is unlikely to have passed up an opportunity for diversion by conversation with an adult so quickly or impassively - or a wish to speak. She kept her mouth closed while looking away from the baby.

(ii) There is evidence that the mother was not interacting animatedly right up to the point when she turned away from the baby. The last utterance prior to the interruption "Had a really busy?" was delivered relatively quietly and without much facial animation. Immediately prior to her turn-away there are signs of sadness in her facial expression: although otherwise neutral, the corners of her lips are turned down slightly which is one of the four characteristics of sadness distinguished by Ekman and Friesen (1975). This is, in all probability, a reaction to the aural stimulus of the experimenter's entrance, and, in this sense, forms a necessary component of her turn-away. (The experimenter could be heard one second before he

entered the room.)

The Infant's Behaviour: The infant's behaviour accompanying and succeeding the mother's turn-away are best described as a manifestation of distress.

Justification for This Interpretation

a. The evidence supporting this description comes mainly from the changes in the baby's facial expression immediately succeeding her mother's turn-away from her to see what the experimenter was doing (Photos. 19-20). As can be seen from Photos. 21-24, there was a marked transformation from the smile which began 1.3 seconds before her mother withdrew and continued until a different expression ensued, .4 seconds after her mother had turned away.

At first (Photo. 18) Sarah showed a low-intensity smile. But this smile faded, to be replaced by an expression according with Ekman and Friesen's (1975) description of mild fear or apprehension .83 seconds after her mother turned away. Sarah's expression continued to change, so that within 1.29 seconds of Event 3 her face registered sadness or distress. And four-fifths of a second later it began to exhibit a mixture of sadness and anger in that the eyebrows were no longer raised at the inner corners but were completely lowered and slightly drawn together (as can be seen from the incipient wrinkles between them, e.g. Photo. 24), while the corners of her mouth were further pulled down.

When Sarah's brow movements and smiling during this interaction are plotted against time (Fig. 3), it can be seen that this is the only direct transition from an expression of happiness to an expression of apprehension and distress (a period during which the eyebrows are

PHOTOS. 18-20 : Interactants' expressions at the start of Event 3.

PHOTOS. 21-24 : Sarah's subsequent expressions.

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lowered - possibly a signal of incomprehension - intervened on all other occasions).

b. Associated with these facial transformations was a decrease in prespeech and gesticulatory movements (Fig. 2) - i.e. the baby talks less to her mother.

c. Many psychologists explain infant-mother interactions in terms of the mother 'fitting' her actions to the behaviour of her infant (e.g. Collis and Schaffer 1975, Kaye 1977). While this cannot be completely true - because infant behaviour is not completely predictable (see pp. 174-177 below) - it must be true to a certain extent, simply because all human interaction involves a certain amount of hypothesis-testing or 'predictive monitoring' (e.g. Garfinkel 1972, Fergusson 1975).

Nevertheless, the context of Event 3 suggests that in this interaction the opposite was also true: that Sarah was predicting her mother's behaviour, but that her predictions were upset by something about which neither mother nor baby could have had prior knowledge - the experimenter's entrance into the room. The mother reacted to this occurrence by turning to see what was going on, thereby ceasing to adapt her behaviour to Sarah's. Sarah, who showed no sign of adapting to the experimenter's entrance directly (i.e. she did not modify her behaviour until after her mother had turned away from her - and she did not turn to look at him), continued to adapt her behaviour to her mother's actions. At first she appeared not to know what was happening (apprehension), then she became distressed (because the interaction had been broken).

Event 4: the mother turns back to her baby without much animation or interest in interacting with her.

FIGURE 3/6 : Distribution of the durations of pauses between maternal
Justification for This Interpretation

There is no doubt that the mother turned back to her baby exactly one second after she turned away to find out what the experimenter was doing. (cf. Photos. and But. 16) But does she turn back without animation or interest? If animation is defined as the total sum of coded maternal social behaviours per unit time, what is the evidence that there is a relative lack of animation in the period immediately following the mother's turn-away?

a. Speech and Vocalisations. She made only two utterances during the nine seconds following her turn back to her baby, and the pauses between these utterances were, respectively, 66, 54 and 51 frames (i.e. 2.75 seconds, 2.25 seconds, 2.1 seconds). These are the three longest pauses in the interaction (see Fig. 6).

The two utterances in question, "Had a busy day? Hello", were delivered at relatively low volume and without any marked intonational stress. Furthermore, there was no evidence that the mother was exercising her imagination in the content of what she said - her utterances were merely repetitions of immediately preceding utterances.

b. Gaze. The mother looked continuously at her child's face up to the point at which she turned away to look at the experimenter (i.e. 41.13 seconds). She turned back to her daughter one second later, but in the subsequent seven seconds she looked away from her daughter twice more - not to look at the experimenter but at the floor. These are the only examples of the mother looking away from Sarah at nothing in particular during the seventy second interaction. The first example came 3.3 seconds after the initial look at the experimenter and lasted .75 seconds. The second came two seconds after the first and lasted .92 seconds.

FIGURE 5/6 : Distribution of the durations of pauses between maternal utterances.

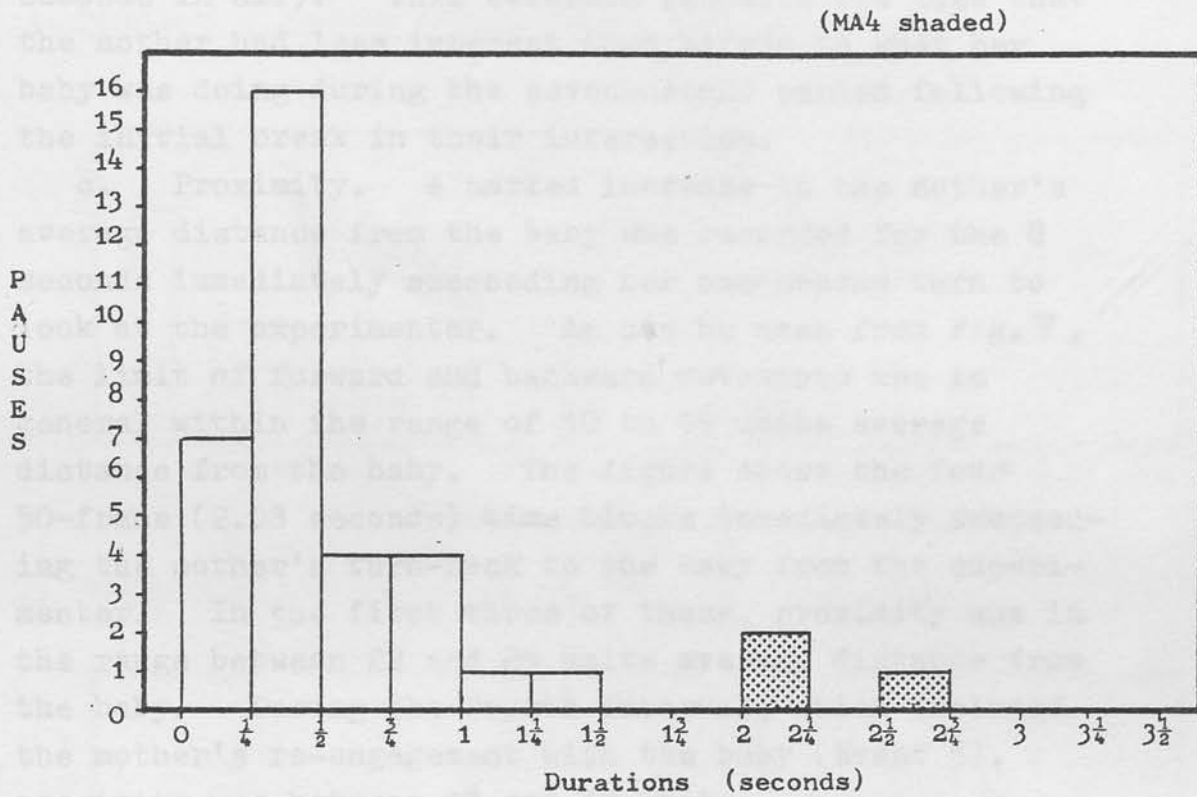
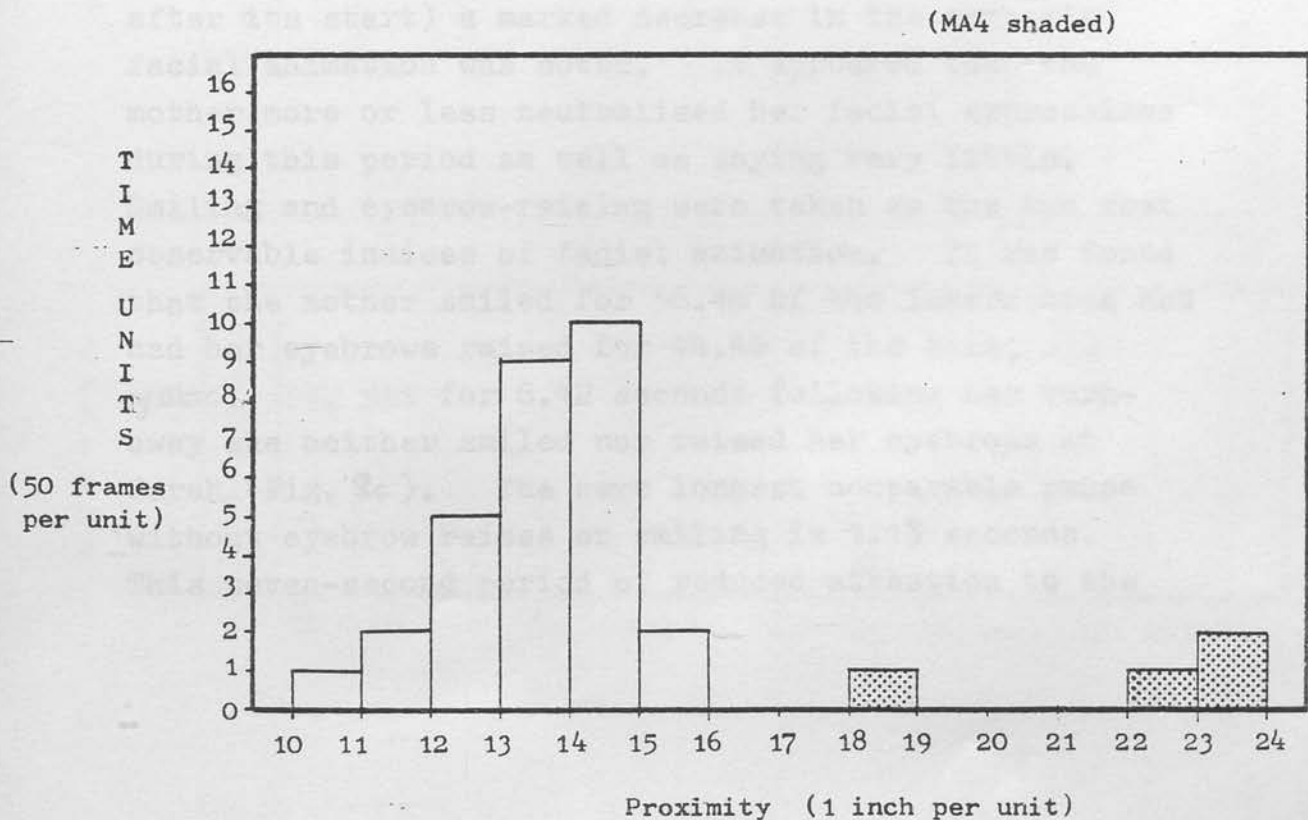


FIGURE 5/7 : Distribution of variations in the mother's proximity to Sarah

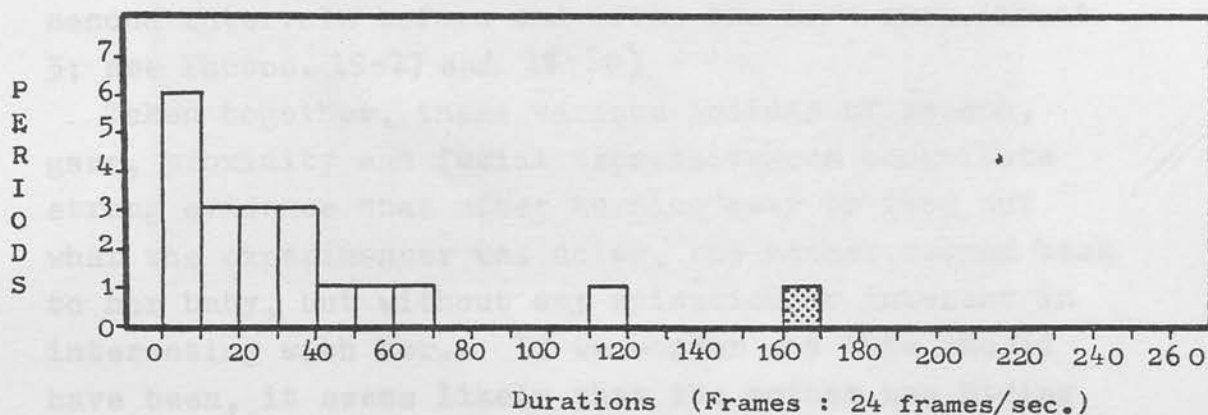
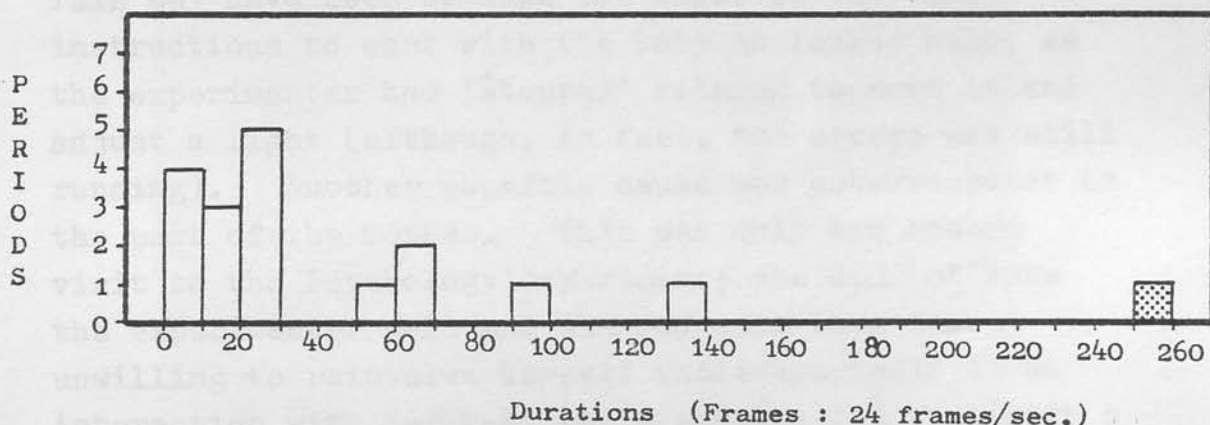
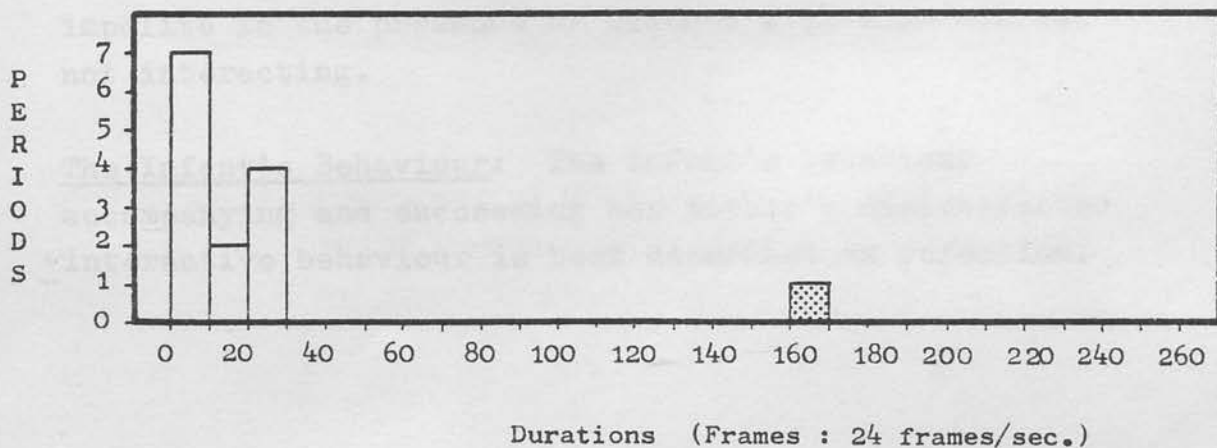


For the remainder of the seventy seconds the mother looked continuously at her baby (and longer: 42.9 seconds in all). This evidence supports the idea that the mother had less interest than before in what her baby was doing during the seven-second period following the initial break in their interaction.

c. Proximity. A marked increase in the mother's average distance from the baby was recorded for the 8 seconds immediately succeeding her one-second turn to look at the experimenter. As can be seen from Fig. 7, the limit of forward and backward movements was in general within the range of 10 to 16 units average distance from the baby. The figure shows the four 50-frame (2.08 seconds) time blocks immediately succeeding the mother's turn-back to the baby from the experimenter. In the first three of these, proximity was in the range between 22 and 24 units average distance from the baby. During the fourth interval, which included the mother's re-engagement with the baby (Event 5), proximity was between 18 and 19 units.

d. Facial Expressiveness. During the period of the interaction being analysed (45.0 - 51.3 seconds after its start) a marked decrease in the mother's facial animation was noted. It appeared that the mother more or less neutralised her facial expressions during this period as well as saying very little. Smiling and eyebrow-raising were taken as the two most observable indices of facial animation. It was found that the mother smiled for 56.4% of the interaction and had her eyebrows raised for 44.4% of the time; yet for 6.42 seconds following her turn-away she neither smiled nor raised her eyebrows at Sarah (Fig. 8c). The next longest comparable pause without eyebrow raises or smiling is 1.13 seconds. This seven-second period of reduced attention to the

FIGURE 5/8 : The mother's facial impassivity during Event 4.

a. Durations of periods between smiles (MA4 shaded)b. Durations of periods between eyebrow raises (MA4 shaded)c. Durations of periods without smiles or eyebrow raises (MA4 shaded)

infant also constituted the longest period without either smiling or eyebrow-raising if these are plotted independently (see Figs. 8a and 8b). The contrast between this and the mother's previous animation can also be shown by comparing photographs taken at one second intervals before and after the turn-away (Event 3; see Photos. 25-27 and 28-30).

Taken together, these various indices of speech, gaze, proximity and facial expressiveness constitute strong evidence that after turning away to find out what the experimenter was doing, the mother turned back to her baby, but without any animation or interest in interacting with her. If we wonder why this should have been, it seems likely that the mother was biding her time until the experimenter went out of the room again before she reinvolved herself in the interaction. This may have been because she believed that her instructions to chat with the baby no longer held, as the experimenter had 'stopped' filming to come in and adjust a light (although, in fact, the camera was still running). Another possible cause was embarrassment on the part of the mother. This was only her second visit to the Psychology Department; she did not know the experimenter well and she may well have felt unwilling to reinvolve herself whole-heartedly in an interaction with her baby while sharing the room with a relative stranger. Indeed, there is a sense in which such a reinvolvement could have been considered impolite in the presence of someone with whom she was not interacting.

The Infant's Behaviour: The infant's behaviour accompanying and succeeding her mother's disinterested interactive behaviour is best described as rejection.

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PHOTOS. 25-30 : Photographs of the mother's face taken at one second intervals before(25-27), and after(28-30) her turn to look at the experimenter.

Justification for This Interpretation

a. Sarah's 'rejection' of her mother is most obviously understood in terms of her visual behaviour. Sarah looked away from her mother for a continuous period of 6.17 seconds following Event 4. Of the nine breaks in Sarah's gaze at her mother's face, this was by far the longest: the others were all less than two-thirds of a second long (see Fig. 9). However, it is clear that this was not simply a response to the mother's break in face-to-face gaze during Event 3: Sarah broke gaze 3.17 seconds after her mother had turned back to her and, even then, Sarah only turned away after she had directed a short burst of prespeech at her mother (see Fig. 23).

b. Why then did Sarah withdraw from her mother while her mother continued to solicit communication with her? The most likely explanation is to be found in terms of the reactions of infants to experimental perturbations in their mother's behaviour (see p. 101 above). Thus, Brazelton et.al. (1975) and Murray (1980) describe how, when a mother becomes unresponsive during a mother-infant interaction, the infant responds with "facial expressions of fear, yawning, grimacing and frowning as well as by gaze avoidance, crying, startle movements and thrashing or struggling" (see Murray 1980 also Trevarthen 1979, Maurer and Salapatek 1976). As argued above, (pp. , Photos.), Sarah's mother turned back to her after Event 3 without much animation or interest in interaction: that is, she became unresponsive to her child. In these terms Event 4 was a second rebuff, adding insult to the injury caused by Event 3: Sarah greeted her mother's return with a bout of prespeech (Fig. 2) only to find that her mother was still 'not talking to' her.

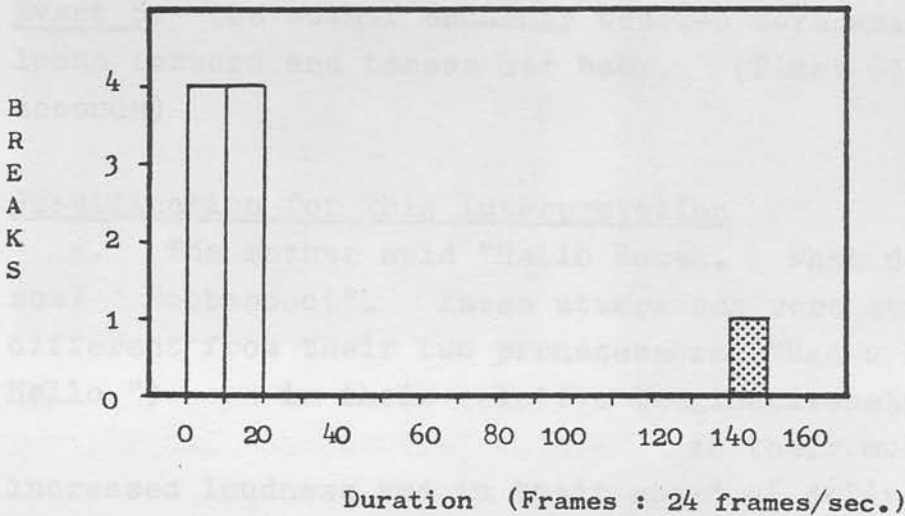
c. In this light, Sarah's facial expressions during Event 4 also appear comprehensible. As

reported by Brazelton et al. and Emery, 1975. In the first facing experimentally interrupted maternal interaction, Sarah manifested a range of emotional reactions including frowning (Photo. 32), grinning (Photo. 33) and expressions of fear (Photo. 34). Sarah was smiling and very little cry and vocal noise after the

FIGURE 5/9 : Durations of Sarah's breaks in gaze.

d. There were a series of other face movements towards and away from the mother. Sarah once looked down to look approximately 120° to the left of her mother's face (Photo. 35). She also looked to the left of her mother's face (Photo. 36) and "thrilled" and "giggling" movements.

(IA4 shaded)



Increased loudness was observed in the three utterances were spoken in about five seconds whereas only "Hello" had been spoken in the preceding five seconds and only two utterances in the preceding ten). Furthermore, this quality of activity was maintained - all periods being very close to each other from this time until the end of this sample of interaction (see Fig. 6).

b. Fifteen frames after uttering "Hello Sarah", the mother moved herself towards her baby 5 distance units (see Fig. 1). She maintained at least this degree of proximity until the end of the interaction.

reported by Brazelton et.al. and Murray, with infants facing experimentally interrupted maternal communication, Sarah manifested a range of expressions including frowning (Photo. 32), grimaces (Photo. 34) and expressions of fear (Photo. 34). There was no smiling and very little oral and manual activity after the initial burst of prespeech (Fig. 2).

d. There were a series of gross trunk movements towards and away from the mother, before Sarah settled down to look approximately 120° to the left of her mother's face (Photo. 36). These correspond to what Trevarthen calls "threshing and struggling movements".

Event 5: the mother suddenly becomes more animated, leans forward and teases her baby. (Time: 51.3 seconds)

Justification for This Interpretation

a. The mother said "Hello Sarah. What do you see? Boobooboo!". These utterances were strikingly different from their two predecessors ("Had a busy day? Hello.") in their relative imaginativeness, in their much increased loudness and in their speed of delivery (the three utterances were spoken in under five seconds whereas only "Hello" had been spoken in the preceding five seconds and only two utterances in the preceding ten). Furthermore, this quicker speed of delivery was maintained - all pauses being under one second long from this time until the end of this sample of interaction (see Fig. 6).

b. Fifteen frames after uttering "Hello Sarah", the mother moved herself towards her baby 8 distance units (see Fig. 1). She maintained at least this degree of proximity until the end of the interaction.

PHOTOS. 31-36 : Sarah's expressions at the start of(31) and following Event 4.

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c. As she leant forward to say "Hello Sarah." the mother smiled for the first time for over $7\frac{1}{2}$ seconds. This smile was held for $2\frac{1}{2}$ seconds - towards the end of it, the mother raised her eyebrows for the first time in $11\frac{1}{2}$ seconds. From this time until the end of the interaction, there was no period longer than 1.13 seconds in which the mother did not either smile or raise her eyebrows (see Fig. 3).

d. Technically, the utterance "Boobooboo" is contentless, and, as shown elsewhere, in a discussion of this same mother-infant pair, contentless utterances are associated with game-playing (Sylvester-Bradley and Trevarthen 1978). This supports the notion that this utterance was humorous. But could it not also be described as "a little joke" as was the utterance "Oo-oo-oo-oo" in Event 1? "Boo" is defined in the S.O.E.D. as an expression of contempt or aversion. I take the exclamation "Oo" to be an expression of surprise or excitement. It is the more aggressive aspect of "Boo" - contrasting with the fact that (repeated thrice) it was both preceded and succeeded by a smile directed at the baby during unbroken face-to-face regard - which leads me to call it a tease rather than a joke. This interpretation accords with the frequent use of "Boo" to evoke surprise in the well-known adult-infant game: 'Peek-a-boo'. This comparison gains further weight from the fact that the utterance in question was spoken immediately after Sarah re-established face-to-face regard with her mother - following a break of six seconds. Thus, the immediate interactive context of the utterance "Boobooboo" is identical with that defined by Bruner and Sherwood (1975) for the utterance "Boo!" in the game of peek-a-boo. That this interactive exchange is not a game of peek-a-boo is shown by the fact that no effort was made by either interactant

to sustain contact during the six-second period of visual withdrawal.

The utterance "Boobooboo" thus suggests that initiative belonged more strongly to the mother in this event than in a genuine game, or in Event 1, where "Oo-oo-oo-oo" appeared to be an imitation of something the baby had initiated (i.e. the way she was holding her mouth). The fact that jokes are usually shared, whereas teasing is more uni-directional, suggests that a distinction between Event 1 and Event 5 on these lines is appropriate.

e. If we ask why the mother should suddenly have become more animated at this point in the interaction, two further facts must be taken into account. First, the experimenter had been heard to leave the room one second before the occurrence of Event 5 - thus the mother was liberated from any uncertainty that his presence provoked. (cf. pp. 100-101 above). And, secondly, the mother's instructions were to chat with her baby - something she had not been doing for the preceding seven seconds, during which time her infant had become relatively less sociable (see below). Thus, if her visit to the Psychology Department was going to be a success, she had to re-establish contact with her baby. Event 5 appeared to be an attempt to do this.

The Infant's Behaviour: The infant's behaviour accompanying and following the mother's increased animation and teasing is best described as 'pleasure in regaining conversation'. (see Fig. 3, Photo. 4). This suggests ambivalence in Sarah's reception of her

Justification for This Interpretation

a. One third of a second after the beginning of the mother's first utterance in Event 5 ("Hello Sarah")

Sarah turned to look at her mother for the first time for six seconds.

b. Sarah turned to look at her mother with a blank expression, with a slack mouth and a slightly furrowed brow (a frown of concentration, doubt or disapproval; Photo. 37). Three seconds later this expression changed to a smile (Photo. 40), followed by a bout of prespeech (Fig. 23). The question remains of how to explain the three-second pause between the re-establishment of mutual eye-to-face contact and Sarah's smile.

The smile began .83 seconds after the onset of the utterance "Boobooboo". This utterance would appear to be the most likely proximate cause of Sarah's smile. In this case Sarah's smile would not be simply a reaction to her mother's increased animation - in which case she would have smiled sooner - but a specific response to her mother's teasing utterance. Indeed, the pause between Sarah turning to look at her mother and her smile bears a close similarity to Sarah's behaviour in Event 1, when it was not until the mother made the joke "Oo-oo-oo-oo!" that Sarah smiled at her. (see pp. 143-144)

c. As described on pages 143 - 144, the mother's utterance of "Boobooboo" was more aggressive than "Oo-oo-oo-oo!". It is therefore interesting to note that the smile Sarah manifested is not as intense in Event 5 as that in Event 1, and that, although it was associated with a brief eyebrow-flash of surprise - an expression ritualised as an intimate greeting in many cultures (Eibl-Eibesfeldt 1975) - the smile was blended in later stages with a frown (see Fig. 3, Photo. 41). This suggests ambivalence in Sarah's reception of her mother's welcome; as one would expect from someone who was being teased.

d. These behaviours suggest that, having been 'out' of the conversation for a number of seconds, Sarah's

146

PHOTO. 37 : Interactants' expressions at the start of Event 5.

PHOTOS. 38-41 : Sarah's subsequent expressions.



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smile was a prelude to her reinvolvement. This became evident in the bout of prespeech which immediately succeeded the smile.

Event 6: the mother begins to respond to her baby's actions in an exaggerated manner, as if enthusiastic to be interested in what the baby was 'saying' (doing). (Time: 54.1 seconds)

Justification for This Interpretation

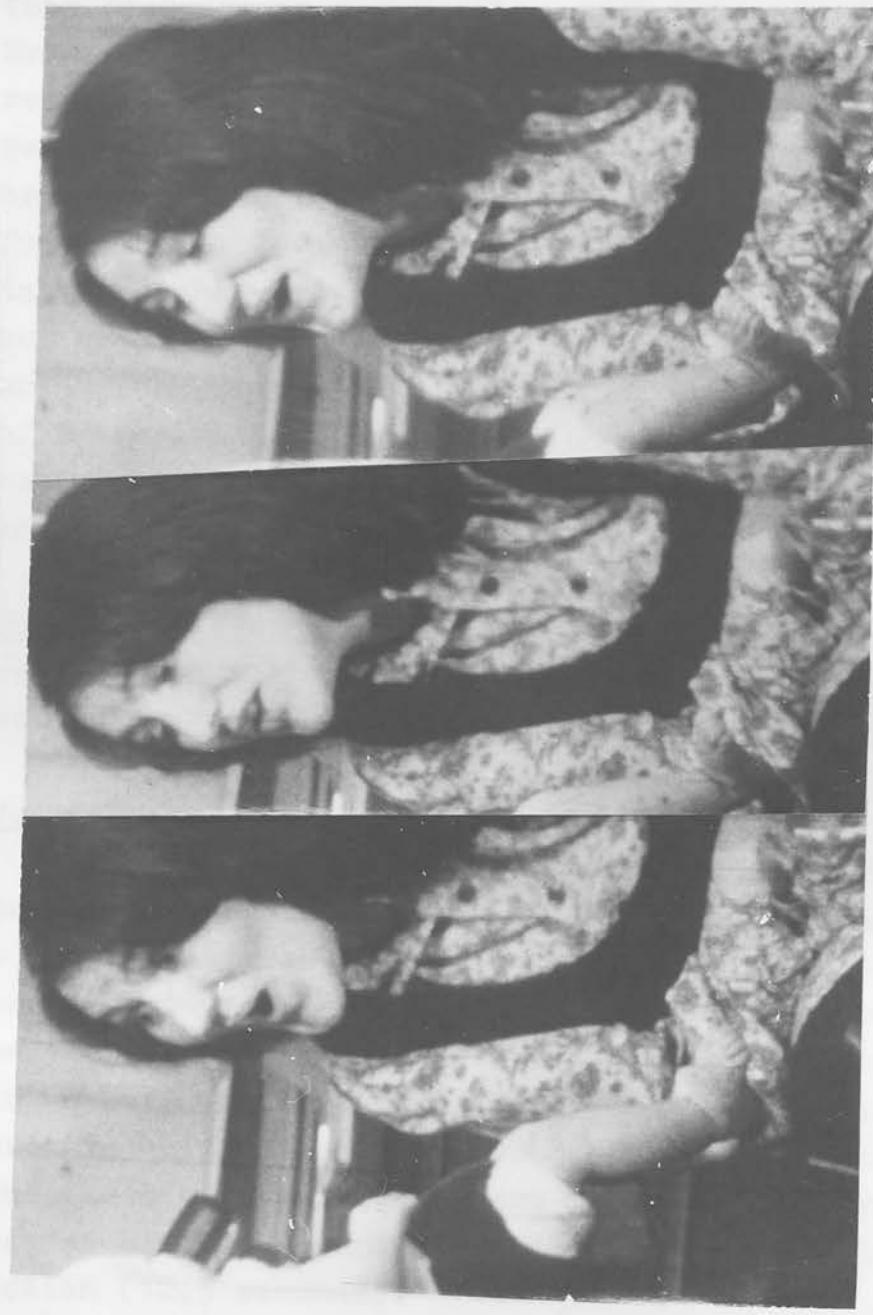
a. During the nine-second period under discussion (i.e. between Event 6 and Event 7), the mother's baby-talk was louder than during any other part of the interaction. One indicator of the gusto with which the mother was speaking was the fact that of the five utterances comprising the content-grouping coinciding with Event 6 (i.e. "Are we going to have a big talk about it? Oh yes! Oh, we goin' to have a big talk about it! Are we? Goin' to have a big talk about it?"), included the two longest (12 syllables) and the third equal longest (10 syllables), all other utterances being 10 (one other example) or less syllables long. This content-grouping also contained the three longest utterances in overall delivery time (i.e. one of 2.54 seconds; two of 2.13 seconds) and the longest lasting two-syllable utterance ("Oh yes!": 1.50 seconds) in the seventy-second period under investigation. Furthermore, this was the only occasion during the interaction in which the mother uses the adjective "big". Indeed, analysis of verbal content shows that, out of the approximately one and a half thousand utterances recorded from this mother during her twelve visits to the laboratory, she only twice more uses this adjective. During the penultimate session she greeted the baby, by then 19 weeks old,

with the words: "Look at Mummy's big girl! (laughing) Look at Mummy's big girl!". On three scores therefore, the mother's babytalk can be described as enlarged beyond what was normal during the interaction as a whole (i.e. 'exaggerated'): loudness, utterance-length, both literal and temporal, and in content, where the infant's contribution to the 'talk' is called "big" while it would be more accurately described as extremely rudimentary.

b. The mother's face registered three times what Ekman and Friesen (1975) call 'extreme surprise' during Event 6 (Photo. 42). Indeed, the criteria for extreme surprise are not only fulfilled by the mother's facial expression, they are overfulfilled (i.e. there is some suggestion of tension or stretching in the mother's mouth-opening). This suggests intentional exaggeration of the expression. There was no other surprise-expression of this intensity during the interaction. Yet, in themselves, the infant's actions were no more extraordinary at this point than during the rest of the interaction (see below).

c. The most similar to Event 6 was Event 2: both comprising maternal responses to conversational actions by the baby. But while in Event 6 the mother remained leaning forward while expressing her surprise - in Event 2 she smiled and swayed back from the baby - as if 'taking her point'. This maintenance of relatively close proximity reinforces the impression of intensity in the mother's interactive behaviour.

d. If we go on to ask why the mother might be interested in what the baby is 'saying' - two answers suggest themselves. The first is that she was simply pleased to have her daughter's attention again - after a period where her daughter seemed relatively unhappy and uninvolved in the interaction. The second is that



PHOTOS. 42-44 : Mother's expressions of surprise ; at the start of Event 6(42), at the start of Event 7(43) and during Event 7(44).

this response is a natural reaction to compensate for Event 4, which was characterised by abnormally reduced responsiveness of the mother to her baby, a form of reparation (or motivational rebound). Both reasons are compatible with the other indications and are given further fuel if it is remembered that the mother's instructions were to chat with her baby; neither she nor the baby had been chatting for a period and the mother was, in Event 6, responding to the first signs of a renewed desire to communicate on behalf of her baby (renewed face-regard, a smile, renewed prespeech and gestures: see below).

The Infant's Behaviour: The infant's behaviour accompanying and following the mother's exaggerated response to her are best described as puzzlement and upset.

Justification for This Interpretation

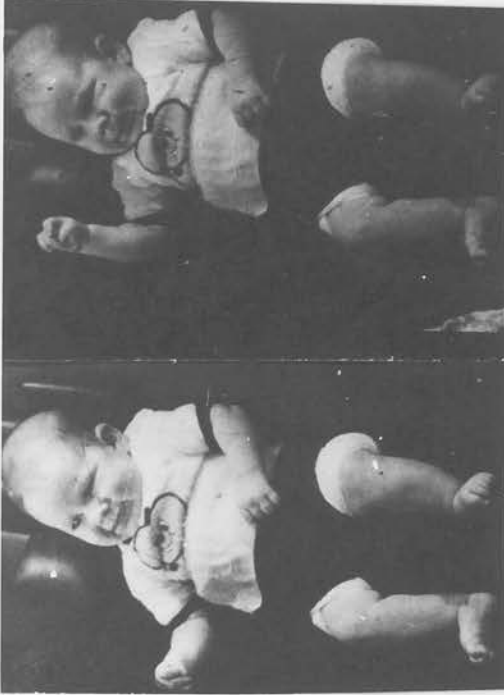
a. The main evidence that Sarah was puzzled by her mother's action in Event 6 is that, having started a bout of prespeech (Fig. 2), she broke off to peer at her mother with drawn-together and lowered brows and only ceased frowning when her mother stopped behaving in an exaggerated manner (see below; Event 7). The breaking-off of her prespeech occurred .71 seconds after the onset of Event 6. There followed the longest period without prespeech since the start of the interaction (12.5 seconds).

b. The above was associated with an expression characterised by drawn-together and lowered brows (see Photo. 46) which was twice briefly modified by raising of the inner corners of the brows to suggest sadness (see e.g. Photo. 48; Fig. 3). This expression was generally accompanied by a mouth with lowered corners and loose ('trembling'; see Appendix 1) lip. As Ekman

PHOTOS. 45-46 : Sarah's expressions at the start of Event 6.

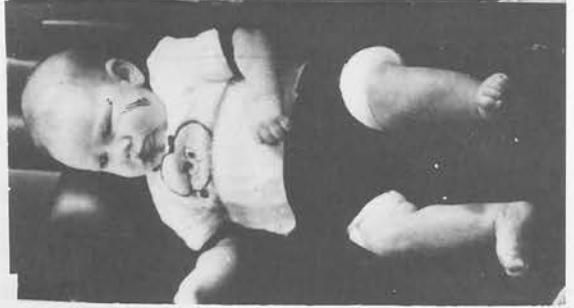
PHOTOS. 47-50 : Sarah's expressions during Event 6.

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and Friesen indicate (1975), this expression can have a number of meanings. Clearly, in this context, it was not a 'conversational punctuator' because it was not a 'momentary change'. Neither does it seem likely, given her age, that Sarah was angry but 'trying to control or conceal any sign of anger'. And, because Sarah's gaze appeared to be relatively defocussed - wandering between the mother's eyes and her mouth - it seems unlikely that Sarah was frowning because she was 'concentrating or focussing on something intently'.

The most likely explanation in Ekman and Friesen's terms is that Sarah was either sad and serious or sad and slightly annoyed. The fact that she was not passive during this period, she continued to make hand and mouth movements at a relatively high frequency (Fig. 2) added to the complexity of her behaviour. Her expressions continued to change - from angry to sad brows and back again twice during the time spanned by Event 6. These changes and the fact that she ultimately looked away from her mother suggest that she was not simply, independently, 'in a serious mood' but was actively trying to adapt to something which was disturbing her. Her actions seemed to be attempts to resolve a conflict. Hence, the description of them as 'puzzled'.

c. Altogether, this was the longest period spent with continuously lowered brows throughout the interaction. In the end Sarah turned away from the mother with a gross trunk movement associated with oral grimacing - an action not dissimilar from that described as 'rejecting' in Event 4. (cf. Photos. and).

Event 7: the mother drops her exaggerated manner and asks the baby a question - introducing a new topic of conversation. (Time: 68.5 seconds)

Justification for This Interpretation

a. It will be observed from page 103 that, at the time in question, there was a transition in verbal content from grouping nine to grouping ten: "Are we going to have a big talk about it ... Goin' to have a big talk about it? You're clever aren't you. You're clever ... etc.". The mother's intonation pattern simultaneously changed from a rising, questioning intonation - "Goin' to have a big talk about it?" - to a more confiding "You're clever aren't you" - spoken relatively quietly, at a lower pitch and with a flatter intonation.

Whereas transitions within content-groupings have been considered as more or less unconscious modifications in response to particular baby-movements, changes of topic are larger-scale and appear to be more deliberate reactions to baby mood-changes (see below). However, the content-change in question did also incorporate a change in grammatical form - from predominantly questioning to predominantly positive declarative (excluding one 'tag-question').

b. This change of topic was accentuated by a change in the angle at which the mother holds her head. Previously she looked at Sarah with her head upright or inclined slightly to the right but at the onset of Event 7, she inclined her head slightly to the left (see Photo. 43), also bringing it forward - meaning that her proximity was, during this content-grouping, closer than at any other point during the interaction (11 distance units; see Fig. 1).

c. The suggestion that the mother drops her exaggerated manner in Event 7 is supported by analysis of her babytalk on other counts. Loudness of speech was reduced. Average length of utterance in syllables for the content-grouping in question was reduced to

less than the overall average for this interaction (i.e. 3.83 vs. 4.74 syllables). And average duration of utterance was only slightly greater than the overall average (i.e. 32.47 vs. 30.30 frames). Similarly, there was a change in topic - no longer was the mother concerned with the baby's immediate reaction to her: "Are we goin' to have a big talk about it?" - but talks instead of the baby's less transitory, less immediately relevant character-qualities: "You're clever aren't you."

d. The mother did not once express extreme surprise during Event 7. Her overriding expression was more neutral and more expressive of concern (see Photo. 44). When surprise was expressed it was slight - the sclera was no more visible than in a neutral expression, neither were the eyelids widely parted (cf. Photos. 42 and 44).

e. Most likely this change on the mother's behalf was a reaction to the baby's confusion at the exaggeration of her manner during Event 6. A prelude to this is suggested by the mother's (unusual) transition from positive statement to question towards the end of Event 6: "Oh yes. Oh we goin' to have a big talk about it. Are we? Goin' to have a big talk about it? You're clever aren't you ... eh". Usually utterances become less not more equivocal as a content-grouping progresses, i.e. question leads to positive or negative declarative.

This observation suggests that the mother had perceived her baby's confusion in Event 6 and that the new conversational initiative represented by Event 7 was calculated as a low-key counter-measure to her previous exaggeratedness in Event 6. This suggestion was borne out by analysis of the infant's behaviour and its temporal relations with the mother's behaviour. During content-grouping nine, Sarah peered at her

mother with a frown: this expression culminated with a movement to look away from her mother (see below). One third of a second after this movement the mother started to make the first utterance of content-grouping ten. and 54). This expression differed from that of

In the light of Trevarthen et.al.'s (1976) clear evidence of quarter-second following by J.C.'s mother, from frame-by-frame analysis of film record, it seems that this negative movement by Sarah was the proximate cause of the change in interactive style in the mother's contribution to Event 7.

f. Another way of looking at Event 7 - which is compatible with the above evidence - is that the mother had released energy by over-compensating for Event 4 in Event 6 and was thus prepared in Event 7 to start conversing with greater calmness.

The Infant's Behaviour: The infant's behaviour accompanying and following her mother's introduction of a new topic into their conversation can best be described as 'reinvolvement'.

Justification for This Interpretation

a. Evidence for this description comes from a marked change in Sarah's behaviour after her mother dropping her exaggerated manner. Sarah had spent a period of 6.92 seconds peering at her mother with a frown, at the conclusion of which she turned away. One third of a second later the mother changed her interactive style: .31 seconds after this, Sarah turned to look back at her mother.

b. Simultaneously, there was a change of facial expression. In the first instance Sarah turned back to scrutinise her mother's face with an expression of concentration. This expression was accentuated by the

way in which Sarah leant forwards, towards her mother, while making it. As soon as she started prespeech she leant back again, as if finished with concentration, having found out what she wanted to know. (cf. Photos. 51 and 54). This expression differed from that of puzzlement in Event 6 in being associated with a concerted visual focus on the mother's mouth, rather than a relatively defocussed gaze at the mother's eyes (Photo. 50), and, in showing no sign of being blended with sadness in the mouth or brows.

b. The change of brow-expression from concentration to surprise is very marked (cf. Photos. 51 and 52). Simultaneous with this change, is a change from focus on the mother's mouth to a focus on her eyes. The fact that 'surprised' brow-raising (in contrast with 'fearful' brow-raising - in which the brows are also drawn together; Photo. 34) forms a greeting in diverse cultures has been mentioned. The fact that the only other time such a movement occurred was with a smile at the onset of a bout of prespeech (Event 5) and that it was also followed here by the onset of prespeech (Event 7 + 3.25 seconds) and a smile (Event 7 + 4.25 seconds; duration 2.92 seconds) supports an interpretation of greeting and reinvolvement in the interaction.

3. Experimental Corroboration

Despite the coherence of the evidence for the above conclusions concerning Sarah's sensitivity to the significance of her mother's social actions, there is no doubt that findings which rest at all upon an experimenter's own introspections are, to some extent, equivocal (Rosenthal 1966). For this reason, in accordance with Labov's (1975) "Experimenter Principle", it seemed advisable to seek judgements of the film under discussion from people who were unfamiliar with

PHOTOS. 51-56 : Sarah's expressions at the start of (51) and during Event 7.

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the theoretical issues implied by those judgements. This was not easy to do however: one problem is that observational techniques and categories used in the study of infants are necessarily products of particular theoretical perspectives; the other problem being that, to train a lay person in the uses of Ekman and Friesen's system for coding facial expressions, kinesics, proxemics and interpersonal gaze as cues for describing communication would have involved an impossibly large investment of time, effort and interest on behalf of lay persons, if not the experimenter. Any procedure which was designed to circumvent these difficulties would simultaneously become a less direct test of the experimenter's original judgements. Nevertheless, an experiment was conducted to test the validity of the above descriptions of Sarah's behaviour as communicative, and we are now in a position to discuss it.

a. Method. Following in the tradition of Frois-Wittman (1930), Woodworth (1938), Schlosberg (1941 1952), Izard (1971), Ekman (1973) and others, it was decided to base this experiment on the judgments by lay women and men of still photographs taken from the film of the seventy-second interaction discussed above. Two sets of stimuli were constructed, each containing seven items corresponding to the seven events discussed above. Items in the first set of stimuli each consisted of two photographs of the mother; the first taken at the onset of the event in question, the second succeeding it by 18 frames (.75 seconds) on the film; to which were added transcriptions of what the mother said during the three-second period immediately preceding the onset of that event and also what she said in an equal period immediately succeeding it.

Items in the second set of stimuli consisted of

seven photographs in two groups; the upper group containing two photographs of Sarah separated by 18 frames on the film, the latter of which was taken from the same frame as the onset of the event in question, while the lower group contained a sequence of five photographs of Sarah, taken at 18-frame intervals, the first of which followed the onset of the event in question by 18 frames (e.g. Photos.31-36, 45-50, 51-56 - each with an additional photograph at the end of the bottom line).

Two groups of subjects were tested with these stimuli. The first, in what was a trial run, consisted of eleven married women, all with child-rearing experience. The second group of subjects, in the main experiment, were forty-six first-term undergraduate students (of which two-thirds were women). Both groups of subjects were asked to match the photographic stimuli with verbal descriptions of the seven events they represented. These verbal descriptions were based directly on the descriptions proposed in the preceding section of this chapter (see Appendix 2).

The subjects had three separate matching-tasks:

Expt.(1) The first was to match verbal descriptions of the mother's actions with the first set of stimuli described above. This task was essentially a test of the validity of the experimenter's interpretations of the mother's actions discussed above.

Expt.(2) The second task was to match the same verbal descriptions of the mother's actions by the experimenter with the second set of stimuli: photographs of the baby's behaviour before and after each of the mother's actions. This was essentially a test of the subjects' abilities at predicting an infant's responses to her mother's actions.

Expt.(3) The final task was to match verbal descriptions of the infant's actions with photographs of the changes in the infant's behaviour which they

were supposed to represent. This was a test of the reliability of the experimenter's interpretations of the infant's actions.

b. Procedure (Main Study). The forty-six subjects were tested in four separate groups numbering between ten and twelve. For each task the subjects were handed their own list of the verbal descriptions relevant to the task in hand. These descriptions were always in the same order as they occurred in the film: (1) to (7). The subjects were told that the list of descriptions they had in their hands referred to a mother-infant 'conversation' lasting seventy seconds and that the experiment was principally a test of their ability to tell what the infant was saying to her mother. The first task was then introduced as a preliminary to familiarise them with the experimental method. In all three tasks, the photographic stimuli were presented simultaneously in varied orders, differing from the order in which they occurred on the film, and each of the four subject-groups saw the photographs in a different, unpredictable order. The stimuli were labelled A to G, and the subjects were asked simply to mark each item in their list of descriptions with the letter of the corresponding photographic stimulus. From their comments during their experiment, they all felt they had some difficulty in doing this (one student did not complete his paper for Task 2). There was no time-limit for the completion of the tasks although no group took longer than a quarter of an hour per task. (See Appendix)

c. Procedure (Trial Run). In the trial run, the procedure was slightly different due to the smaller sample-size. The eleven mothers were asked to perform the same three tasks in the same order with the same two sets of seven photographic stimuli. However, for

each task, they judged the stimuli in series, not simultaneously, but, having made their first set of judgements 'blind', they were given the same stimuli again and asked to make new judgements. Furthermore, in this trial run the verbal descriptions upon which the subjects were basing their judgements were less refined than in the main study. As can be seen below, the raw data from the two studies were, however, very similar.

d. Results (Expt.(1); Tables 1 and 2). For all the experiments, results are presented in tables. These show the distributions of judgements made by the judges. The experimenter's prediction is that, if his interpretations are absolutely unequivocal, judges should all be able to identify the photographic stimulus to which each interpretation applies. In this case, all judgements would fall along the diagonals of the tables: the stimulus representing Event 1 photographically would be paired with the experimenter's verbal description of Event 1, stimulus 2 with description 2 and so on.

The results of Experiment 1 show, first, that there is no appreciable difference between the number of choices which were predicted from the experimenter's analyses (underlined integers), and the sum of the choices which were not predicted (Main study: 157 vs. 165 (48.7%); Trial run: 80 vs. 74 (52.0%)). However, there was a predicted difference for three actions taken individually: mothers' action no. 3 - MA3 - (Main: 43/3; Trial: 15/7), MA4 (Main: 37/9; Trial: 13/9) and MA6 (Main: 28/18; Trial: 20/2). Furthermore, on inspection, it becomes clear that the distribution of the unpredicted choices is not unsystematic (Woodworth 1938). For example, if one takes the first MA (the mother greets her baby with a joke) its confusion

(Predicted judgements underlined)

TABLES 5/1 and 5/2: Results of Experiment 1 showing how judges paired the experimenter's verbal descriptions of seven maternal actions with photographic stimuli representing those actions

TABLE 5/1: Main Study (N = 46)

	Event	Mother's Actions	Judgements						
			MA 1	MA 2	MA 3	MA 4	MA 5	MA 6	MA 7
S T I M U L I	1	Greeting	<u>10</u>	10		4	14	5	3
	2	Listens	19	<u>9</u>	1	3	2	5	7
	3	Turns Away	1		<u>43</u>	2			
	4	Unresponsive	3	1	2	<u>37</u>	2	1	
	5	Teases	7	8			<u>14</u>	4	13
	6	Exaggerates	3	7			2	<u>28</u>	6
	7	New Topic	3	8		4	12	3	<u>16</u>

(Predicted judgements underlined)

TABLE 5/2: Trial Run (N = 22: 2 judgements per judge)

	Event	Mother's Actions	Judgements						
			MA 1	MA 2	MA 3	MA 4	MA 5	MA 6	MA 7
S T I M U L I	1	Greeting	<u>10</u>	4		5		2	1
	2	Listens	2	<u>8</u>			2	9	1
	3	Turns Away			<u>15</u>	7			
	4	Unresponsive		1	2	<u>13</u>	1		4
	5	Teases		4		5	<u>8</u>	2	1
	6	Exaggerates		1				<u>20</u>	1
	7	New Topic		13		2		1	<u>6</u>

(Predicted judgements underlined)

with MA4 in the trial-study (the mother turns back to her baby without any real interest) may seem inexplicable. But when it is pointed out that the original wording of the description of MA4 was "the mother greets her baby without any real interest" the confusion is seen to be more comprehensible: it is based on inability to see the difference between greeting with interest and greeting without interest, not on the inability to see a difference between greeting and unresponsiveness (the wording of this description was changed in the main study and errors of this type were reduced by half). Thus, it becomes clear that some actions are more closely related than others: there is a close kinship between MA1 and MA5 because both constitute greetings, the first after the mother has been out of the room; the second after a spell of unresponsiveness on behalf of the mother (see above, pp. 131 - 147). There is a relationship between MA5 and MA7 because both entail a marked change in interactive style which has immediate positive consequences on the subsequent course of the interaction (see above, pp. 147ff). There is also a close relationship between MA2 and MA6 because both are reactions by the mother to the onset of a bout of prespeech by the baby, the main difference being that the latter is more exaggerated than the former. Similarly there is a relationship between the two least sociable actions in the sequence: MA3 and MA4.

Thus one can create three larger categories of maternal action:

- (i) greeting/positive adaptation of interactive style (MA1; MA5; MA7),
- (ii) responding as if listening (MA2; MA6), and
- (iii) relatively low sociability (MA3; MA4),

in which (i) and (ii) are more closely related to each other than to (iii), but in which (iii) is more closely related to (ii) than to (i). With these categories one may illuminate possible regularities inherent in the distribution of the choices in Tables 1 and 2 by predicting the relative frequencies, not only of correct choices but also of incorrect choices in terms of rank-orders (see Tables 3 and 4).

The most outstanding exception to the predicted rank-orders of choice-frequencies in the three possible categories is the high frequency of interpretations of MA2 as 'greeting' in the main study. This is probably to be explained by the subject's equating 'mother's smile' with 'mother greeting' as the stimulus for MA2 was the only stimulus in this set incorporating a photograph of the mother smiling.

In both experiments, the average error from that predicted was less than a third of that expected by chance. Chance would give an average error of .87 rank-steps; the observed levels were .29 rank-steps for the main study and .24 rank-steps in the trial. This is the same level of error as found by Schlosberg (1941) in his study of the judgements of adult facial expressions (though he was using a six-step circular scale).

It might appear possible to demonstrate that the choices in this part of the experiment are not a matter of chance by performing a Friedman two-way analysis of variance by ranks on the data in Table 3. If this is done, the test shows that there is less than one chance in ten thousand that the choices made are independent of the relationships between the expressions argued for in the preceding section of this chapter (Main study: $\chi^2 = 20.86$, df 2; Trial: $\chi^2 = 21.50$, df 2). However, to perform any statistical test in this context is to

TABLES 5/3 and 5/4: Results of Experiment 1 showing goodness of fit between the experimenter's verbal descriptions of seven maternal actions and independent judgements of photographic stimuli representing these actions when these actions are put into three categories - high, medium and low sociability

TABLE 5/3: Main Study (N = 46)

	Event	Mother's Actions	Judgements		
			Same Category	More Related Category	Less Related Category
S T I M U L I	1	Greeting	27	15	4
	2	Listens	14	28	4
	3	Turns Away	45	0	1
	4	Unresponsive	39	2	5
	5	Teases	34	12	0
	6	Exaggerates	35	11	0
	7	New Topic	31	11	4

TABLE 5/4: Trial Run (N = 22: 2 judgements per judge)

	Event	Mother's Actions	Judgements		
			Same Category	More Related Category	Less Related Category
S T I M U L I	1	Greeting	11	6	5
	2	Listens	17	5	0
	3	Turns Away	22	0	0
	4	Unresponsive	15	1	5
	5	Teases	9	6	5
	6	Exaggerates	21	1	0
	7	New Topic	8	14	0

violate one of the principal underlying assumptions of such tests: that the variables, the measurements of which form the basis on which the test is computed, vary independently of each other. This is clearly not the case in the studies reported here (nor, incidentally, in the studies of Schlos berg 1941 and 1952 - where statistical tests were used), as the subjects' choices will be a product of comparisons between the seven stimuli which could fill each descriptive category. Thus, the choice of a stimulus including a smile as the representative of a particular category will not be based simply on the characteristics of this particular stimulus; it will also be affected by the dissimilarities between this stimulus and the other stimuli. In the company of a different set of stimuli, this stimulus might be judged quite differently. On the other hand, the idea that the availability of comparisons should be eliminated from experiments on facial expression is not acceptable because these judgements naturally rely on comparison; hence the results of such experiments would not be a true measure of the subjects' abilities to judge the expressions in question.

One resolution of this dilemma would be to present each of the stimuli separately but in a standard context, that is, in the company of a standard set of stimuli, not connected with the particular stimuli under investigation. This solution would not be ideal because the stimulus would still not be judged in its natural context and there would be endless theoretical difficulties in deciding what should comprise the standard set of stimuli to accompany each expression under test (see Sherman 1927). Nevertheless, this experimental design would produce results amenable to statistical analysis.

As the experiments reported here were not designed

to conform to the statistical assumption of independent variability, statistical testing will not form the basis of the interpretation of their results. There are certain advantages in the experimental design used in these studies over the commonly used one outlined above: the first is that, by comparison with photographic stimuli of the same face, contamination of judgements by variability of idiosyncratic personal styles of expression (Ekman and Friesen 1975) is eliminated. Secondly, this design, by incorporating a list of events, described in the order in which they occurred naturally, gave the subjects some idea of the natural situation from which the expressions were drawn; supplying them with some relevant contextual clues.

e. Results (Expt.(2)). The results in Tables 5 and 6 show that subjects found it harder to relate photographs of the infant's actions to description of the preceding actions of the mother than it was to relate the same descriptions to photographs of the mother's actions. The level of maximum consensus was 38.8% (42.8% for the trial) in Task 2 as against 53.1% (57.4% for the trial) in Task 1. Only 25.8% (31.1%) of the choices were as predicted for this task as against 48.8% (51.9%) in Task 1. Nonetheless, there are interesting contrasts to be drawn between these results and those for Task 1. Taken individually, certain descriptions of the mother's behaviour make more consistent sense to the subjects when confronted with photographs of the infant's reactions than they did in Task 1, while others make less.

The clearest case of an increase in consensus is in the students' reaction to the description of MA1 (cf. Tables 1 and 5). The students also understood MA2 in a different light when confronted with photographs of prespeech in IA2 - the second infant action. However, in both the trial and the main studies, the

TABLES 5/5 and 5/6: Results of Experiment 2 showing how judges paired the experimenter's verbal descriptions of seven maternal actions with photographic stimuli representing the infant's corresponding actions

TABLE 5/5: Main Study (N = 46)

Event	Infant's Actions	Judgements						
		MA 1	MA 2	MA 3	MA 4	MA 5	MA 6	MA 7
S T I M U L I	1 Pleased	<u>22</u>	6	1		6	1	9
	2 Prespeech	4	<u>17</u>	5	1	1	2	15
	3 Upset			<u>9</u>	29		8	
	4 Rejects	2		6	<u>9</u>	10	17	
	5 Teased	9	6	5	1	<u>14</u>	4	6
	6 Puzzled	3	13	9	1	2	<u>7</u>	10
	7 Reinvolved	5	3	9	4	13	5	<u>5</u>

(Predicted judgements underlined)

TABLE 5/6: Trial Run (N = 22: 2 judgements per judge)

Event	Infant's Actions	Judgements						
		MA 1	MA 2	MA 3	MA 4	MA 5	MA 6	MA 7
S T I M U L I	1 Pleased	<u>8</u>	4				9	1
	2 Prespeech	1	<u>10</u>	6	3		1	1
	3 Upset		1	<u>6</u>	10		1	4
	4 Rejects			10	<u>9</u>		1	2
	5 Teased				3	<u>12</u>		7
	6 Puzzled		4	6	6		<u>0</u>	6
	7 Reinvolved	3	2		1	4	9	<u>3</u>

(Predicted judgements underlined)

subjects found it difficult to predict the effect on the baby of the mother's exaggerated response in MA6, even though they showed in Task 1 that they found the description itself one of the easiest to understand in terms of the mother's behaviour.

f. Results (Expt.(3)). The results from experiment 3 show that subjects found it about as easy to relate descriptions of the infant's actions to photographs of those actions as they did to relate descriptions of the mother's actions to photographs (plus babytalk) in experiment 1. For this task the level of maximum consensus was 50.6% in the main study and 59.1% in the pilot study: 47.8% of the choices were as predicted in the main study and 52.6% were as predicted in the pilot study. These figures represent a great improvement over experiment 2, in which the same photographs were judged. The improvement is principally due to a more accurate discrimination of the negative expressions of the baby (IA3; IA4; IA6) with increased recognition of prespeech.

Although the balance of 'correct' and 'incorrect' choices in this task is almost exactly equal, there is good evidence, as in experiment 1, that this inaccuracy is more apparent than real. Thus, if we take Woodworth's (1938) scale of relatedness for adult facial expressions, we can adapt it to the infant facial expressions used as stimuli in this experiment, and so derive a table for the relative degrees of error represented by each 'incorrect' choice in experiment 3. Woodworth's scale of relatedness is as follows:

- 1 Love, Happiness, Mirth
- 2 Surprise
- 3 Fear, Suffering
- 4 Anger, Determination
- 5 Disgust
- 6 Contempt

The principal and secondary facial expressions represented in the seven stimuli for experiment 3 were as follows:

STIMULUS	PRESPEECH	PRINCIPAL EXPRESSION	SECONDARY EXPRESSION
1		Happiness	
2	Continuous		(negative)
3	Partial	Sadness	Fear
4		Fear	Anger
5	Partial	Happiness	(Anger)
6	Partial	Anger	Sadness
7	Partial	Surprise	Happiness

Stimulus 2 is the most difficult to analyse in terms of facial expression because it principally represents prespeech. It was therefore decided to add a column marking the presence or absence of prespeech in each stimulus. Only two stimuli were completely devoid of prespeech (1 and 4). Events 3 and 5 directly preceded or succeeded a bout of prespeech (see Fig. 3) while IA2, IA6 and IA7 definitely overlapped with bouts of prespeech.

The following assumptions are made:

(i) That the number of 'wrong' choices should be directly proportional to the degree of relatedness borne by the facial expressions chosen to those predicted;

(ii) That relatedness of infant expressions can be judged in terms of Woodworth's (1938) independently derived scale for the relatedness of adult expressions;

(iii) That relatedness is to be judged on Woodworth's scale in terms of the principal expressions represented in each stimulus except in ambiguous cases where the decision must be made in terms of the secondary

expressions: a table of predicted relatedness can be worked out for the set of choices appropriate to each stimulus except stimulus 2. Stimuli were deemed related to stimulus 2 primarily in terms of presence or absence of prespeech; secondarily, in terms of amount of prespeech as shown in Figure 2 ; and, thirdly, in terms of principal expression (where stimulus 2 was seen as more negative than positive in expression). (See Table 7.)

Stimulus 4 was seen as the least related to others in terms of expression in that the most marked change it represented was a gross body-movement - a turn away from the mother (see pp. 140 - 143 above). For this reason stimuli 3 and 6 were seen as more closely related to each other than to stimulus 4.

The average error per choice is .74 rank-steps in the main study (Table 8). The error which would be produced by chance is 2.26 rank-steps. This compares favourably with the degree of accuracy in prediction reported in Schlosberg's (1952) much-quoted study. Similar results are produced by rank-analysis of the trial study (Table 9), where the average error per choice was .90 rank-steps.

Friedmann two-way analysis of variance of these results would show that there was less than one chance in a thousand that these choices did not depend on the senses of the facial expressions described by the experimenter (see above pp. 161 - 163; (but see also pp. 164 - 167)).

Nonetheless it is clear that analysis of these results by seven ranks is not wholly supported by the data, particularly in the trial study, where no scores fell in the sixth and seventh ranked cells and where there was no overall difference between the second and third ranked cells. Similarly, in the main study, the

TABLE 5/7: Predicted ranks of judgements in Experiment 3

EVENT	INFANT'S ACTIONS	JUDGEMENTS						
		Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7
1	Pleased	1	5	7	2	3	6	4
2	Prespeech	2	7	6	3	5	4	1
3	Upset	3	6	4	2	5	7	1
4	Rejects	4	6	4	2	5	7	1
5	Teased	5	1	7	2	3	6	4
6	Puzzled	6	3	4	2	5	7	1
7	Re-involved	7	5	1	2	3	6	4

(Ranks in brackets)

TABLE 5/9: Trial Run (N = 22; 2 judgements per judge)

Event	Infant's Actions	Ranks of Expected Judgements						
		1	2	3	4	5	6	7
1	Pleased	15(1)	3(2½)	3(2½)	1(4)	0(6)	0(6)	0(6)
2	Prespeech	15(1)	0(6)	3(2)	2(3½)	2(3½)	0(6)	0(6)
3	Upset	8(2)	11(1)	1(3½)	1(3½)	0(6)	0(6)	0(6)
4	Rejects	20(1)	0(6)	2(2)	0(5)	0(5)	0(5)	0(5)
5	Teased	7(2)	4(3)	11(1)	0(5½)	0(5½)	0(5½)	0(5½)
6	Puzzled	9(2)	11(1)	1(3½)	1(3½)	0(6)	0(6)	0(6)
7	Reinvolved	6(2½)	8(1)	6(2½)	0(6)	2(4)	0(6)	0(6)
RANK SUMS		11½	18½	17	29	34	41	41

(Ranks in brackets)

TABLES 5/8 and 5/9: Results of Experiment 3 showing the ranked frequencies of judgements of photographic stimuli representing seven infant actions as compared to the relative frequencies expected from the experimenter's descriptions of the same actions

TABLE 5/8: Main Study (N = 46)

	Infant's Event Actions	Ranks of Expected Judgements						
		1	2	3	4	5	6	7
S T I M U L I	1 Pleased	19(1)	9(3)	8(4)	12(2)	0(6)	0(6)	0(6)
	2 Prespeech	25(1)	12(2)	4(3½)	1(5)	0(6½)	4(3½)	0(6½)
	3 Upset	22(1)	20(2)	4(3)	0(5½)	0(5½)	0(5½)	0(5½)
	4 Rejects	41(1)	3(2)	1(3½)	0(5½)	0(5½)	1(3½)	0(5½)
	5 Teased	15(2)	17(1)	10(3)	2(4)	0(6½)	1(5)	0(6½)
	6 Puzzled	17(2)	21(1)	1(5)	4(3)	3(4)	0(6½)	0(6½)
	7 Reinvolved	15(2)	18(1)	8(3)	3(4)	2(5)	0(6½)	0(6½)
	RANK SUMS	10	12	25	28½	38½	36½	42½

(Ranks in brackets)

TABLE 5/9: Trial Run (N = 22: 2 judgements per judge)

	Infant's Event Actions	Ranks of Expected Judgements						
		1	2	3	4	5	6	7
S T I M U L I	1 Pleased	15(1)	3(2½)	3(2½)	1(4)	0(6)	0(6)	0(6)
	2 Prespeech	15(1)	0(6)	3(2)	2(3½)	2(3½)	0(6)	0(6)
	3 Upset	9(2)	11(1)	1(3½)	1(3½)	0(6)	0(6)	0(6)
	4 Rejects	20(1)	0(5)	2(2)	0(5)	0(5)	0(5)	0(5)
	5 Teased	7(2)	4(3)	11(1)	0(5½)	0(5½)	0(5½)	0(5½)
	6 Puzzled	9(2)	11(1)	1(3½)	1(3½)	0(6)	0(6)	0(6)
	7 Reinvolved	6(2½)	8(1)	6(2½)	0(6)	2(4)	0(6)	0(6)
	RANK SUMS	11½	18½	17	29	34	41	41

(Ranks in brackets)

first and second ranked cells were not clearly distinct, nor were the fifth and sixth. But, although analysis by five ranks would have been equally applicable to these results, this does not affect the basis of the relatedness between the expressions which enabled the predictions to be made, nor the validity of their fulfilment in the results of this experiment. In contrast, when the same form of analysis is applied to the results in experiment 2, the outcome is equivocal (see Tables 10 and 11). In experiment 2, the average error per choice was 1.26 rank-steps for the main study, and 1.71 rank-steps for the trial study (chance level = 2.26).

g. Discussion. In experiments on the judgement of adult facial expressions the usual proportion of correctly predicted choices is between 50% and 60% (Argyle 1969). The average in this experiment (Tasks 1 and 3) was almost exactly 50% (51.9% and 48.8%; 47.8% and 52.6%). Ekman (1973) was only able to achieve levels of predicted agreement greater than this by selecting stimuli representing emotional extremes. There was nothing particularly extreme about the interaction from which the expressions used as stimuli in this experiment were drawn and all but one of the stimuli judged (the stimulus for IA1) represented emotional 'blends', which Ekman eliminated from his experiment. Three of the other stimuli represented blends of happiness (IA2; IA5; IA7), four represented elements of anger (IA2; IA3; IA5; IA6), and two represented elements of fear (IA3 and IA4). The infant-expressions were therefore much more open to confusion than is normal in this type of experiment. Furthermore, the range of expressions as measured on Woodworth's scale was much smaller than is usual in experiments on the judgement of emotions: contempt and disgust were not represented at all in

TABLES 5/10 and 5/11: Results of Experiment 2 showing the ranked frequencies of judgements of photographic stimuli representing seven infant actions as compared to the relative frequencies expected from the experimenter's descriptions of the corresponding maternal actions

TABLE 5/10: Main Study (N = 46)

Event	Infant's Actions	Ranks of Expected Judgements						
		1	2	3	4	5	6	7
S T I M U L I	1 Pleased	22(1)	6(3½)	9(2)	6(3½)	1(5½)	1(5½)	0(7)
	2 Prespeech	17(1)	15(2)	5(3)	2(5)	1(6½)	4(6½)	1(6½)
	3 Upset	9(2)	8(3)	29(1)	0(5½)	0(5½)	0(5½)	0(5½)
	4 Rejects	9(3)	17(1)	6(4)	10(2)	0(6½)	0(6½)	1(5)
	5 Teased	14(1)	9(2)	6(3½)	5(5)	6(3½)	4(3½)	1(7)
	6 Puzzled	7(4)	9(3)	1(7)	13(1)	2(6)	10(6)	3(5)
	7 Reinvolved	5(4)	13(1)	5(4)	3(7)	9(2)	5(2)	4(6)
RANK SUMS		16	15½	24½	29	35½	33½	42

(Ranks in brackets)

TABLE 5/11: Trial Run (N = 22: 2 judgements per judge)

Event	Infant's Actions	Ranks of Expected Judgements						
		1	2	3	4	5	6	7
S T I M U L I	1 Pleased	8(2)	0(6)	1(4)	4(3)	0(6)	9(1)	0(6)
	2 Prespeech	10(1)	1(5)	6(2)	1(5)	0(7)	1(5)	3(3)
	3 Upset	6(2)	1(4½)	10(1)	0(6½)	1(4½)	4(3)	0(6½)
	4 Rejects	9(2)	1(4)	10(1)	0(6)	0(6)	2(3)	0(6)
	5 Teased	12(1)	0(5½)	7(2)	0(5½)	0(5)	0(5½)	7(3)
	6 Puzzled	0(6)	6(2)	6(2)	4(4)	0(6)	6(2)	0(6)
	7 Reinvolved	3(3½)	4(2)	3(3½)	2(5)	0(7)	9(1)	1(6)
RANK SUMS		17½	29	15½	35	42	20½	36½

(Ranks in brackets)

these stimuli. These drawbacks were partly offset by the provision of supplementary non-photographic material in experiment 1 - apposite samples of the mother's babytalk - and by familiarisation with the interactional context from which the stimuli were drawn during the course of the experiment by exposure to sequential descriptions of both the mother's and the infant's interactional behaviour. Experiment 3 was also made easier by the provision of seven photographs in sequence for each stimulus and by providing an image of the infant's whole body, not just her face, so that kinesic clues, as well as facial clues, were available to the judges.

Bearing all this in mind, and remembering that although many errors were made, they were made in an order which could be predicted from a known scale of relatedness for adult expressions, it must be concluded that the descriptions of the actions of infant and mother discussed in the preceding sections of this chapter are more likely to be valid than not. These descriptions are phrased in terms of the sense of both infant's and mother's action. If these actions did not have any sense, or if they had senses different from the particular senses ascribed to them above, it would seem unlikely that the descriptions could be used for differentiating the respective expressions from each other as successfully as found in this experiment.

It must be concluded that the infant, Sarah, was responding comprehendingly to a psychological sense of her mother's actions: this is the most parsimonious explanation of the seven coincidences of maternal and infant action described in the preceding part of this chapter.

There remains one subsidiary issue to be discussed: the significance of the results in experiment 2. What

these results suggest is that infant behaviour is not particularly predictable; at least, not prima facie and not by laywomen and men. This may be partly because in our culture we are not well practised in conversing with babies, and that, with practice, predictions would be more accurate. But, in accepting that infants can communicate, we must appreciate that communication implies discretion - as do many infant actions (see pp. 62 - 65 above) - and so it is unlikely in principle that any general equation of a stimulus-response variety will ever be applicable to infant behaviour.

With adults, the prediction of action depends on an intimate knowledge of the context in which the agent finds himself or herself, as well as their previous experience, mood, values and idiosyncracies. With our present lack of knowledge, we cannot expect a qualitative difference between these requirements and the requirements necessary to predict what an infant will do during an interaction.

4. Conclusion

This chapter has shown that a nine-week old girl communicated with her mother - that is, her actions only made sense as purposive responses to the actions of her mother. If it is felt that this does not satisfy the criterion of communication in adult conversations then it may be better to say simply that Sarah has been shown to interact with her mother. But in this interaction she has been shown to have great sensitivity to the social significance of her mother's actions and thus revealed herself to have a complex personality (in the generic sense). Thus she welcomed her mother's company and enjoyed her humour, she felt upset when ignored in favour of another, she disliked

her mother's loss of interest in interacting with her and was disconcerted when her mother became over-assertive.

Insofar as this baby was not mentally abnormal, we must conclude that there is a faculty for intersubjectivity in the second month of life.

Chapter 6: INTERSUBJECTIVE ENVIRONMENTS IN THE FIRST SIX MONTHS OF LIFE

In the previous chapter, evidence was presented showing that a nine-week-old girl had a complex sensitivity to actions of her mother. Evidence to be reported in the next two chapters suggests that such sensitivity is a general characteristic of young babies. But, if babies are so sensitive to other people at such a young age, in what can their 'development' consist? This is the question to be addressed in the present chapter.

Because many psychologists are not aware of infants' early intersubjectivity, they view this to be one of the products of language. Clearly, in the light of the findings presented here, this is an unacceptable view. An alternative is the view that the faculty of intersubjectivity itself undergoes development during infancy. This is the view favoured by Trevarthen, and because Trevarthen is one of the few scientists who acknowledge the presence of intersubjectivity in early infancy - it is his hypothesis upon which we shall initially concentrate.

As discussed in Chapter 5, Trevarthen reports that the first six months of development are characterised by three major shifts: a shift from 'autistic' to 'protoconversational' behaviour at five weeks, a shift to an interest in objects at ten weeks, and, at

Chapter 6: INTERSUBJECTIVE DEVELOPMENTS IN THE FIRST SIX MONTHS OF LIFE

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As discussed in Chapter 1, Trevarthen reports that the first six months of development are characterised by three major shifts: a shift from 'autistic' to 'protoconversational' behaviour at five weeks, a shift to an interest in objects at ten weeks, and, at

sixteen to twenty weeks, a rekindling of social interest through the medium of object-person and person-person games. This would predict a high level of interest in adults' faces and behaviour from six to ten weeks of age followed by a decline and then a recovery of interest as person-person games develop during the fifth and sixth months.

These predictions are, in some ways, similar to those derived from cognitive theories of schemata formation (as put forward by Kagan 1970, Schaffer 1971, Pick Frankel and Hess 1975, and others). These theories are put forward to explain two well-documented trends in early perceptual development: that, with increasing age, infants show greater visual interest in increasingly complex patterns (Berlyne 1958, Spears 1964, Brennan Ames and Moore 1966, Karmel 1969 1974, Greenberg 1971, Greenberg and O'Donnell 1972); and that infants show a greater interest in novel than in familiar stimuli from around the beginning of their second month onwards (Weizmann Cohen and Pratt 1971, Greenberg Uzigris and Hunt 1970, McCall and Kagan 1967, Wetherford and Cohen 1973). The explanation is based on an idea originally put forward by Hebb (1949) and Hunt (1969): that perceptual development in infancy consists in the progressive construction of schematic mental representations of the external world (schemata) which get increasingly complex with age. It predicts that infants will pay most attention to objects which are moderately dissimilar from the things they already know (i.e. of which they have already formed schemata): stimuli which are very well known or highly discrepant from what they have seen before will receive relatively little attention. This is called the "discrepancy hypothesis" and has been most consistently championed in recent years by McCall and Kagan (e.g. 1967 1969).

In the past the discrepancy hypothesis has generally been supported by experiments in which infants are made familiar with one object - often over a period of weeks

- then, under controlled conditions, exposed to this now familiar object with either one or a sequence of novel objects, differing in degree of discrepancy from the original (e.g. Holm 1975). At about four months of age, infants are found on a number of measures to attend longer (visually) to strangers' faces than they do to the faces of their mothers (LaRoche and DesBiolles 1976, Cohen 1974, Bernard and Ramey 1977, Fitzgerald 1968). At first sight it seems that this finding can be explained by the discrepancy hypothesis:

"as the schema for a human face i.e. the mother's becomes well established, between 2 and 4 months of age ... the strange face becomes optimally discrepant from that schema" (kagan 1970)

and so is looked at more.

So, in line with Trevarthen's predictions, Kagan's statements lead one to expect a decline in attention to the mother's face between 2 and 4 months of age. One would also expect a relative increase in attention to strangers' faces over the same period. But the discrepancy hypothesis predicts that familiar stimuli which are less complex than the mother's face should get less attention than her during the 2 to 4 month period. Thus if young babies were repeatedly exposed to a simplified representation of the human face (a smiling face-mask for example), attention to this should peak earlier and decline earlier than attention to real faces.

Another set of predictions concerning the development of infants' attention to people can be derived from theories which explain behaviour as a product of 'arousal' or 'excitement' (e.g. Stern 1971 1977). Thus if, as Stern proposes, infant attention is reduced by both hyper- and hypo-arousal, one would expect that, under normal conditions, the most arousing stimulus (e.g. a strange

adult) would receive most attention and progressively less arousing stimuli (e.g. a familiar adult or parent, an unfamiliar face-mask, a familiar face-mask) would receive decreasing amounts of attention. Alternatively, if the baby were already highly aroused, the least arousing stimulus (e.g. the familiar face-mask) would receive most attention and more arousing stimuli would receive progressively less attention. In these terms one would not expect stimuli with markedly different arousing-properties both to receive large amounts of attention or relatively similar stimuli to receive very different amounts of attention.

This chapter reports an experiment to test these three different sets of predictions about the development of infants' interests in faces during the first six months of life. The main experimental study was preceded by a pilot study.

1. Pilot Study

a. The aim of this study was to familiarise the experimenter with Trevarthen's (1977) methods of recording and analysing early social behaviour while attempting to tease out the most significant questions to be asked about such behaviour during the first six months of life.

b. The subject, Sarah (whom we have already met in Chapter 5), was her mother's first child, born by caesarian section at full-term, with her mother under heavy sedation. Her mother had been working as secretary and general organiser of a student publishing body until her daughter's delivery. (She is now reading for a Bachelor degree in Philosophy and Literature.) Sarah's father was at the time of the study working on a Ph.D. thesis in phenomenology. Both parents come from New Zealand.

Sarah's mother contacted us when Sarah was seven weeks old. Having been told that we were interested in early social development and what would be expected of her in the longitudinal study I was undertaking, she agreed to participate.

She brought Sarah into the laboratory twelve times during the twelve week period in which Sarah aged from 8 to 20 weeks. The intervals were approximately weekly, the two longest being 8 and 11 days, the two shortest being 2 and 6 days.

FIGURE 6/1 : Variations in positive regard and smiling at mother
by Trevarthen and Hubley's (1978) subject, Tracey,
between eight and twenty weeks of age.

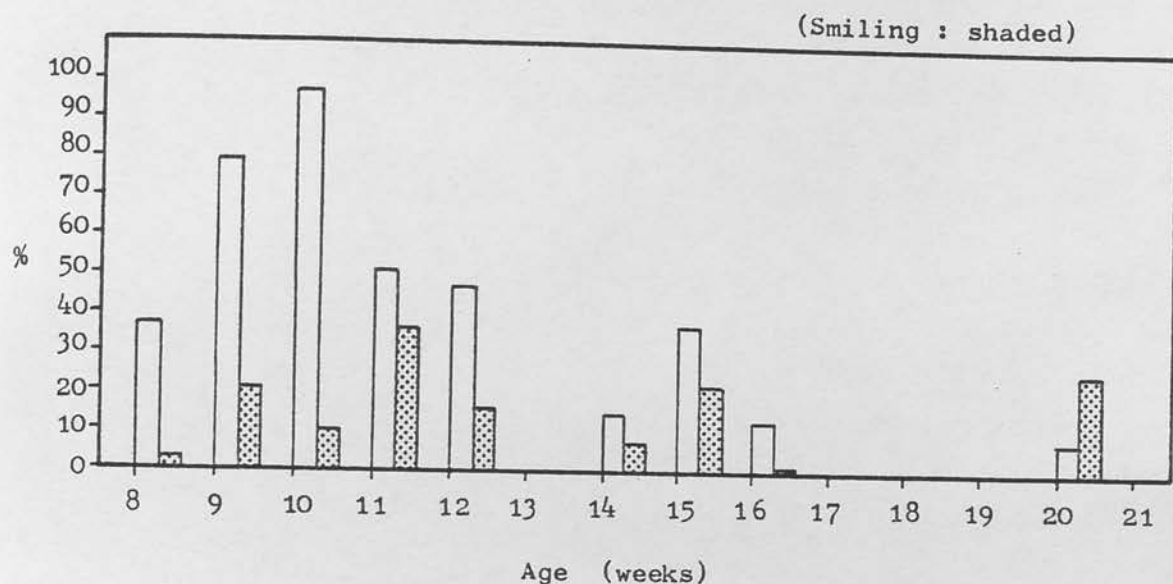
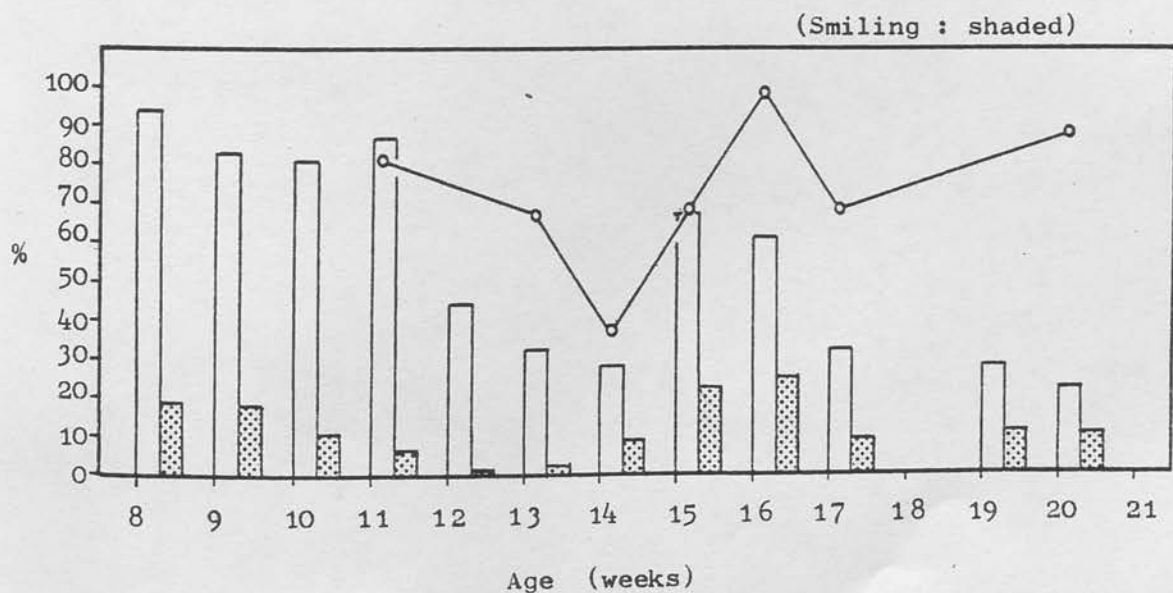


FIGURE 6/2 : Variations in positive regard and smiling at mother
by Sarah between eight and twenty weeks of age,
including comparisons with positive regard at strangers.



(Positive regard at strangers : continuous line)

c. The procedure was basically that reported in Chapter 3. In each session, the baby was secured in the baby-chair and her mother was asked to chat with her. These sessions produced, on average, four and a half minutes of recorded mother-infant interaction (on video-tape supplemented by film). On seven of her twelve visits, Sarah was also introduced to an adult other than her mother, with whom she interacted in the same way. And on six visits she was recorded in the 'reaching' condition described in Chapter 4.

d. Analysis of the data was conducted first by coding Sarah's behaviour in terms of three indices: smiling, crying and looking at her mother. Subsequently, more detailed analysis was undertaken of selected portions of interaction.

e. The initial analysis revealed marked changes in Sarah's social behaviour. At a gross level these changes formed a simple pattern. In the early sessions (weeks 8-11), Sarah was interested in and happy to interact with her mother: her scores for visual regard and smiling were high and she hardly cried at all. But from the thirteenth week onwards, something seemed to go wrong. In exactly the same interactional setting as hitherto, she became fretful. She would screw up her face, whimper protestingly and arch her back (Photos. 96-97). This change revealed itself by a marked drop in the amount she smiled and looked at her mother, together with increased crying. This sort of behaviour continued off and on up to the end of the study. But, from the sixteenth week a new form of behaviour was observed: although Sarah often disregarded and fretted at her mother's attempts to interact with her, she would also from time to time, derive great amusement from them. This development revealed itself in a considerable increase

in smiling during these later recording sessions, an increase in visual regard and decreased crying. The pattern of changes emerges most clearly if smiling is plotted against age with the proportion of each interaction for which Sarah looked at her mother without crying (i.e. 'positive regard': Fig.2).

Analysis of Sarah's behaviour with adults other than her mother revealed that in only one of these seven interactions did Sarah look (without crying) less than with her mother. However, her interactions with 'strangers' gave the impression of being less intense and more wary than with her mother; for example, her peak-levels of smiling were much greater with her mother than with strangers. Overall, the pattern of Sarah's behaviour with her mother was not reflected in her behaviour with other adults: she would often spend a considerable time interacting with a stranger when, immediately before, she had more or less ignored her mother (Fig.2).

Analysis of Sarah's reaching behaviour revealed a fairly normal development: relatively little interest in prehension at the start of the study, a marked increase in the fourth month of life but without any successful grasps - which only appeared at the end of the study (Appendix 3: Fig 3)

f. More detailed a posteriori analyses of some of these recordings are reported elsewhere in this thesis: of 'protoconversation' (primary intersubjectivity) in Chapter 5 and of negativity in Chapters 7 and 8. Aspects are also discussed in Sylvester-Bradley and Trevarthen (1978: Appendix 3), particularly a transition in the mother's behaviour from 'mirroring' to game-playing which was associated with the increase in Sarah's interest in her mother at around sixteen weeks. The discussion of mirroring has been expanded into

Chapter 8 of this thesis. Game-playing is discussed below.

In games such as those occurring in these interactions, there was close synchronisation of sounds with actions. The games had a regular structure which lasted several seconds, and this structure was always accentuated vocally by the mother, and often by the baby too. Thus a phase of assertive action by the mother - which often had a vocally stressed beat - was inevitably followed by a pause during which the mother looked at her baby and smiled, laughed or called out. If the baby expressed enjoyment at this point, by happy animation or a call, the game would usually be renewed, although often in a slightly altered form.

As an example we will consider a game which took place when Sarah was sixteen weeks and four days old. This game consisted of five structurally similar bouts which together lasted eighteen seconds. The game began with Sarah sitting quietly watching her mother, but with both hands up to her mouth, sucking her fingers. The mother, who had previously been imitating Sarah by sucking her own fingers with exaggerated sucking-noises, leaned forward saying "Sucking's good eh! Eh! Eh!", flashing her eyebrows at each "Eh!". She then began clicking her tongue aggressively with her face held provocatively close to Sarah's face, staring intensely with raised eyebrows (Photo. 57). After three seconds in this posture the mother stopped clicking her tongue, moved her head back for one second, saying "Boo!" and then repeated her previous action: bringing her head forward and clicking her tongue at Sarah (for two seconds). Throughout these preliminary stages, Sarah's expression and posture remained unchanged. The mother then leaned back again (for one second) and said "Ha!" At this point, Sarah reached

PHOTOS. 57-60 : Interactants' expressions at the start of (57), during (58-59) and at the end of a person-person game (Sarah, aged 16 weeks).

57



58

59



60

towards her mother's face with her right hand, apparently trying to grab her bottom lip. At this action, the mother smiled and opened her mouth, as if to bite Sarah's hand. There followed a brief period of uncertainty (1.7 seconds) in which the mother made as if to close her mouth on Sarah's hand but didn't, briefly clicked her tongue while still focussing on Sarah's hand, and then opened her mouth widely again. Finally, she brought her head forward, closed her mouth on Sarah's finger and began to make a quacking-noise, not dissimilar to that made by Walt Disney's Donald Duck. Almost immediately Sarah began to smile. In the process of quacking the mother's mouth rapidly opened and closed on Sarah's finger. Meanwhile, the mother kept Sarah under close surveillance from the corner of her eye (Photo. 58). After one second, the mother disengaged, leaned back and smiled briefly (.46 seconds) at Sarah, who was still smiling and continued to smile more or less intensely for the next nine seconds. This was the end of the first bout of the game. Five more bouts followed, each having an homologous structure to the first bout, although the components varied in length. Certain innovations were introduced as the game progressed: in the second bout, the mother introduced a lateral, back-and-forth 'worrying' motion of the head, as if she were a dog with a rat in her mouth, shaking it to death (each head movement lasted approximately .2 seconds). Another innovation was that, although it was the mother who initiated each bout - by opening her mouth and moving her head temptingly close to Sarah's hand - Sarah also became involved in getting the bout underway, because the mother would not begin 'worrying' until Sarah attempted to grab her lip. Other developments included alterations in the mother's vocalisation

during the 'worrying' phase of the game, and Sarah mirroring with her own mouth the way the mother opened her mouth prior to 'biting' Sarah's hand - suggesting close sympathy between the two of them (Photo. 59). On two occasions (Bouts 2 and 3) the mother broke eye-contact with Sarah during the 'worrying' phase of the game. During Bout 3, Sarah spent the 'worrying' phase of the game with her face turned away from her mother, although laughing continuously. Table 1 presents a summary of the game and its variations. As can be seen from it, there were certain similarities between the tongue-clicking preliminaries of the game and the game which eventually emerged.

The game's ending seems to have been more the mother's doing than Sarah's. Thus the last bout ended with the mother leaning back and saying "You're silly. You're silly". Then, leaning forwards, as if to begin a sixth bout of the game, she suddenly appeared undecided and began clicking her tongue instead - avoiding Sarah's hand just as Sarah snatched at her mouth. The period of uncertainty continued and, finally, after four more seconds, Sarah dropped her arm and looked down at her feet (Photo. 60).

Clearly, when analysing a game like this, one needs to know how much practice the infant and mother have had at playing this game and others like it. And, despite the smallness of the behaviour-sample collected during this study, investigation reveals that this game does have antecedents. Even during the first recorded interaction, the mother was saying (playfully) "I'll bite your hand off. Yes I will. Silly Sarah. I'm going to bite your little hand off. Yes I am." These early utterances appeared to be a response to the way in which Sarah gesticulated during these interactions - which she did frequently (see e.g. Photos. in

TABLE 6/1: Analysis of a game played by Sarah (aged 16 weeks) and her mother

BOU:		Prelim.	Prelim.	1	2	3	4	5	6
Mother's mouth opens	YES V1	NO		YES	YES	YES	YES	YES	YES
Mother moves mouth towards Sarah's hand	0.79s	0.17s		1.04s TC	0.51s	0.71s	0.75s	1.54s	0.67s
Sarah's hand moves to grasp mother's mouth	NO	NO		NO (C)	YES	YES	YES	NO	YES
Mother 'bites' Sarah's hand and vocalises(V)	2.96s NB TC	1.25s NB TC		0.92s Q	2.25s Q	2.63s V3	0.92s V4	1.75s V5	(D) NB TC
Mother moves head back and looks at Sarah	0.63s	0.46s		0.21s	0.29s	0.25s	0.29s	0.33	
Sarah is seen to be smiling	NO	NO (B)		YES	YES	YES	YES	YES	
Mother smiles	0.66s (A) V2	0.54s		0.46s	0.33s	1.25s	0.63s	1.54s V6	
Length of bout	5.04s	2.42s		2.63s	3.38s	4.84s	2.59s	5.16s	0.67s

Total length of game: 26.73s.

Key: V1 = "Eh! Eh!"

V2 = "Boo"

V3 = "Baba-baba-baba"

V4 = "Booboo-ber"

V5 = "Boo-boo-boo-baaa"

V6 = "You're silly. You're silly"

(A) = does not smile

(B) = reaches hand towards mother's face

(C) = mother re-opens mouth

(D) = moves head back

TC = tongue-clicking

Q = quacking

NB = no biting

Chapter 5).

It should be said that although this was one of the most successful games recorded during the study, this mother initiated games as early as her first visit to the laboratory.

g. Conclusions. Both the initial and a posteriori analyses generally accorded with Trevarthen's descriptions of early intersubjective development (the only exception was that, with Sarah, person-object games did not seem very successful, although the mother did try them; Photo.126). A particularly interesting finding was that, in a number of sessions, Sarah appeared to prefer interacting with a stranger to interacting with her mother. This gave rise to the hypothesis that these and similar findings reported in the literature (Polak et.al. 1964, Fitzgerald 1968, Kagan 1970, Trevarthen 1975; see Chapter 7 for discussion) might be the product of negativity directed specifically towards mothers between the ages of two and five months. Owing to the theoretical neglect of negativity in early infancy, the confirmation of this hypothesis would prove of substantial importance to developmental psychology. The next chapter presents a number of analyses to test it.

2. Main Study

a. The aims were primarily to examine further Trevarthen's general description of early social development but also to examine the alternative predictions about the development of infant attention derived from the discrepancy hypothesis and arousal theory. Four 'stimuli' were used: the mother in interaction with the baby, a stranger in interaction with the baby, a face-mask with which babies had been made familiar in the home and an unfamiliar face-mask.

Predictions from Trevarthen's statements suggest that there should be a peak of interest in the mother's face

between six and ten weeks of age followed by a decline. During this decline or 'relative negativity of motivation towards the mother', the stranger should receive more attention than the mother. Finally, during the fifth and sixth months, there should be a renewal of interest in the mother with the emergence of interpersonal games (Trevvarthen makes no statements concerning the development of attention to face-masks).

The discrepancy hypothesis would also predict a peak of attention to the mother's face at around two months of age followed by a decline during which the stranger received relatively more attention than the mother between two and four months of age. Attention to the familiar face-mask should already be at a low level by two or three months. The unfamiliar face-mask should receive more attention than the familiar face-mask from three months onwards - but less than the amount given to the mother or the stranger, because it is significantly less complex than they are.

Arousal theory does not make firm predictions as to the development of attention. Rather, it predicts that stimuli will be attended to in order of their arousing-properties - increasingly arousing stimuli receiving increasing amounts of attention up to a limit beyond which they become progressively more aversive. The infants' reactions to particular stimuli will depend on his or her immediate 'state', but one would not expect similar stimuli to receive very different amounts of attention or very different stimuli (e.g. the stranger and the familiar face-mask) both to receive large amounts of attention.

b. The subjects for this study were, like Sarah (and Trevvarthen and Hubley's (1978) subject, Tracey), first-born girls. There were five of them (one mother

withdrew from the experiment half-way through in order to help her husband run their newly-acquired fish and chip shop. She was replaced - by Julie and her mother). Their mothers were contacted three or four weeks after the birth. They were of very different backgrounds. Thus:

(i) Joanna's father was a post office engineer and her mother was, before Joanna's birth, a secretary also working in the post office. The family's home was a Victorian flat in a pleasant middle-class suburb of Edinburgh (Comely Bank). The flat was not large but was bright and well-kept. Her mother adopted a friendly and businesslike attitude to the experiment and apparently found little difficulty in organising visits to the Psychology Department into her daily routine. Her attendance-record was the most regular of all five mother-baby pairs and during recording sessions she took a lively interest in what was going on.

Joanna suffered from colic throughout the first six months of life. This was clearly trying for the mother, not only because it was painful for the child but because it caused mess.

(ii) Angela was born to parents of avowedly Christian uprightness. Her father ran an escort agency while her mother - of African, but ultimately Indo-Asian extraction - had been engaged in hospital nursing before the birth. Both parents were older than their counterparts in the experiment.

Angela's mother suffered from an old back injury which, for much of Angela's early months, necessitated the wearing of an unwieldy and uncomfortable plaster corset. She had been told that this injury would significantly reduce the likelihood of her bearing a

living child and, as a result, Angela's birth was seen by the parents as something of a miracle (Angela = "little angel").

The father, via the office of whom all phone-calls to their cavernous, antique-filled Regency flat were relayed, adopted a somewhat suspicious attitude to the experimenter and the experiment - not infrequently suggesting that the experimenter was not doing what he had said and apparently feeling that his wife was being put to a lot of trouble for no good reason. In contrast, the mother was very cooperative.

Throughout the period of this case-study, the parents were looking for a full-time nanny for Angela. During Angela's first six months, at least six different girls were employed to help look after her.

(iii) Leigh's father was a fitter and her mother had worked in the management of map-marketing before the birth. During the period of the study, the family moved from a flat in the inner city to a new detached residence in a quiet estate in the low-density southern suburb of Liberton. There was regular contact between Leigh and her maternal grandmother - the only grandmother to attend a recording session.

Leigh's mother set aside one afternoon of the week for her visits to the laboratory. If for any reason Leigh could not come on a Wednesday afternoon, she would usually not come until a subsequent Wednesday afternoon was clear. During the early recording sessions Leigh's mother appeared to be rather anxious; as soon as Leigh showed the first signs of getting upset, her mother began to talk about taking her home rather than trying to calm her down. However, during the course of the study, the mother's attitude relaxed so that she apparently came to view the experiment as a bit of a lark - 'being on the tele' - as well as a nuisance.

(iv) Jakilene's father was a Corporation bus driver but her mother had not had a job recently prior to Jakilene's birth. They lived on the third floor of a run-down block of Corporation flats among many identical run-down blocks of flats in the drab post-war Forth-side suburb of Muirhouse.

Jakilene's mother clearly enjoyed her free, taxi-paid outings to the Psychology Department. Not infrequently they were the main event in her week and on one occasion she said that she hadn't been out of her flat since her previous visit to the laboratory. Towards the end of the case-study, she went to hospital having been diagnosed as anaemic. Her daughter meanwhile had grown from a relatively small neonate into a great big bouncing six-month-old - so big that her size had drawn comment from her health visitor. (Later, the mother whispered conspiratorially to the experimenter that she had been feeding her baby four times as much baby food as the health visitor had recommended - two jars a day instead of one jar every two days.)

Jakilene's father took a great interest in his daughter's participation in the experiment and frequently Jakilene's visits were arranged to coincide with her father's coming off shift so that he could come and see what was going on. Both parents expressed regret when the experiment came to an end.

(v) Julie came into the study late (at the age of ten weeks) as a replacement for another baby. Her father was a joiner working in a large construction firm, often working well away from Edinburgh. Her mother had not recently been in employment. They lived with their dog in a tiny flat in the old working-class area of Leith.

Julie's mother often forgot to be in her flat at the

times appointed for taxis to pick her up and bring her to the laboratory. She often appeared to be pre-occupied and was quite difficult to communicate with, often using only ambiguous monosyllables during conversations. She was not on the telephone and frequently, on the experimenter's late morning visits to her home, she answered the door in her dressing-gown, appearing to have only just got up.

She was not articulate verbally and her interactions with Julie were seldom as animated as those of the other mother-baby pairs. She usually sat a long way back from her baby and kept her coat and hat on throughout recording sessions.

Because of the practical difficulties in negotiating with and motivating her, only nine recording sessions were successfully arranged.

c. Procedure. It was planned to bring each baby into the laboratory ten times between the ages of six and twenty-six weeks. Due to unforeseen circumstances (illnesses and holidays), the intervals between visits were not all as regular as had been wished. However, only one interval was longer than a month (six weeks) and only one baby was recorded on less than ten occasions (Table 2). Behaviour was recorded on videotape.

The aims of the study made it desirable to distinguish between different explanations of anti-social behaviour with the mother. These include hyper-arousal (Stern 1971) and cognitive over-familiarity (Kagan 1970) as well as dislike. For this reason, the infants were all recorded in four conditions:

- (i) With their mother: the mother being asked to chat with her baby (see Chapter 3 for details);

TABLE 6/2: Details of recording sessions

Infants	No. of sessions	No. of conditions	Total recorded (seconds)	Mean length of condition (seconds)	Standard deviation (seconds)
JOANNA	11	40	10412.36	260.31	80.48
ANGELA	10	39	11359.35	291.27	49.74
LEIGH	10	35	7875.03	225.00	96.06
JAKILENE	10	40	9837.17	245.93	82.36
JULIE	9	34	7716.4	226.95	77.72
SUMMED	50	188	47200.31	251.07	81.27

TABLE 6/3: Comparison of proportions of visual fixation in different conditions each session (summed ranks for whole study)

(Low scores show consistently high visual fixation)

Infant	Condition			
	Mother	Stranger	Familiar Mask	Unfamiliar Mask
JOANNA	24	20	15	21
ANGELA	27	16	22	25
LEIGH	23	12	17	18
JAKILENE	34	21	21	24
JULIE	18	15	24	23

(ii) With a stranger: someone whom the baby had never seen, or had only seen briefly before the session, was introduced to the baby and asked to sit and chat with her for a few minutes. In all but two of the fifty instances the strangers were women, the majority of whom were experienced in handling babies.

(iii) With a familiar mask: a three dimensional, coloured, 'smiling' face-mask was taken to each baby's home when she was four weeks old. This was hung above or near the infant's cot. Each mask was fitted with a flashing torch-bulb and battery to attract the infant's attention, and mothers were instructed to switch on this light for at least ten minutes every day when the infant was alert. On each visit to the Psychology Department, while sitting in the baby-chair, they were confronted with an identical mask fitted with an identical 'flasher' unit.

(iv) With an unfamiliar mask: the infants were also confronted with one of five unfamiliar three-dimensional masks, fitted with the same 'flasher' unit. These represented a clown, a pirate, an Indian princess, a gypsy and a gangster. The infants saw each of these five masks twice, but never with less than a two-month gap between exposures. (Experiments on 'one-trial' learning suggest that the infants are unlikely to have remembered the 'novel' masks for more than a month e.g. Cohen and Gelber 1975.)

Conditions lasted, on average, slightly over four minutes (Table 2). The conditions were planned to occur in an unpredictable order for each baby - with each condition occurring equally often in each of the four serial positions. When the babies were at their youngest however, they were exposed to their mothers first, as their behaviour in this condition was the most

crucial for the study being undertaken and it was also thought important that, to allay their fears, the mothers should understand as early as possible the way in which the experiment was being conducted. In general, the infants appeared to be content in all conditions and only occasionally was a session cut short because an infant was unhappy: out of the recording of a potential two hundred conditions, only twelve had to be cancelled and five of these cancellations were caused by failures of equipment. In all thirteen hours and six minutes of video-sound material were recorded.

As the order and length of conditions was not rigorously controlled, a number of tests were carried out to see whether there were 'order' effects or 'time' effects. There was however no consistent waning of attention with time and the only 'order' effect was a tendency for crying to increase as the session progressed. This was not significant, however, having a probability of occurring by chance of only slightly less than one half (Friedmann Two-Way Analysis of Variance for all completed sessions in which crying occurred: $\chi^2 = 28.18$, $df = 28$).

d. Analysis of the data focussed primarily on looking behaviour. The time of each look at and away from the person or mask to which the infants were exposed was noted, as were the onset and offset of smiles and cries.

e. Findings. The initial aim of these case-histories was to explore social development in the first six months of life, and, specifically, to determine if a phase of intense social interest (6-10 weeks) is followed by a period during which babies look at and want to interact less with people - being more interested in objects (11-16 weeks), after which they become more cheerful in interaction through the medium of

increasingly elaborate games (17-30 weeks).

Findings from the present study which support this description are as follows:

(i) The highest level of positive regard at the mother during an interaction was universally seen in sessions recorded between the infant's eighth and tenth week of life. This was not only true for the five girls in the main study, but also for Sarah and Tracey. The likelihood of this occurring by chance is very small ($p = .34 \times 10^{-4}$). Insofar as looking without crying is a measure of social interaction in infancy, this confirms that after an early period of relatively intense interest in people, there is invariably a cooling of interest in chatting with the mother (see Fig. 3).

(ii) If the session with the most positive regard is taken from the three periods 6-10 weeks, 11-16 weeks and 17-26 weeks, the lowest maximum is recorded for the middle period in four out of the five babies in this study (Angela is the exception, Fig. 4). However, this was not true of either Sarah or Tracey - for whom the lowest maxima were recorded after 16 weeks of age.

(iii) For six of the seven babies studied, the period from 6-10 weeks included at least one interaction with the mother during which there was a relatively large amount of smiling (i.e. 19% or more, by time: Fig. 4; Angela was the exception).

Findings which do not coincide with Trevarthen's description of early development are:

(i) The lowest amount of positive regard during an interaction was only once recorded during the period from 11-16 weeks (i.e. for Julie). The likelihood of

FIGURE 6/3 : Variations in positive regard at mother by five babies between six and twenty-eight weeks of age.

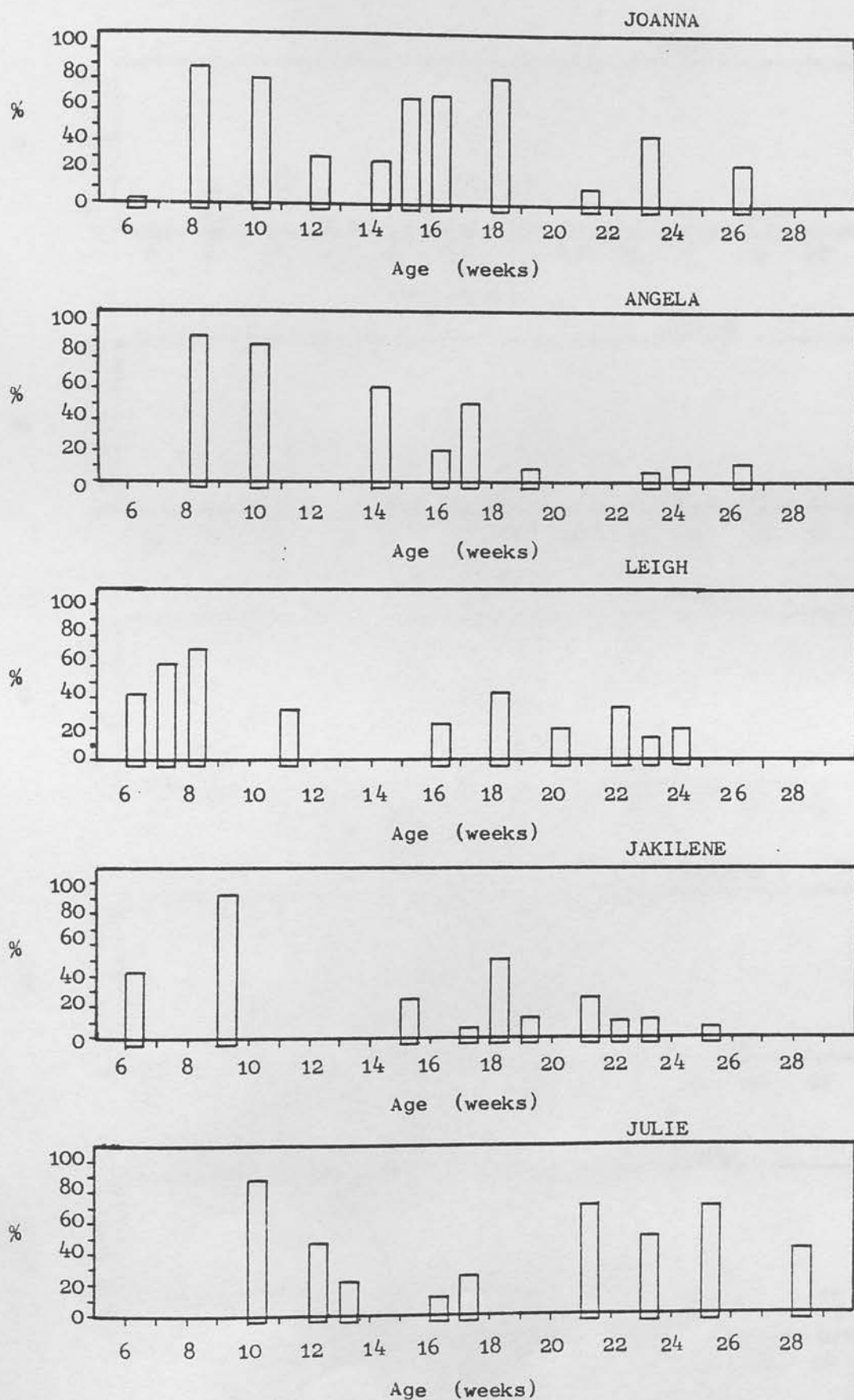
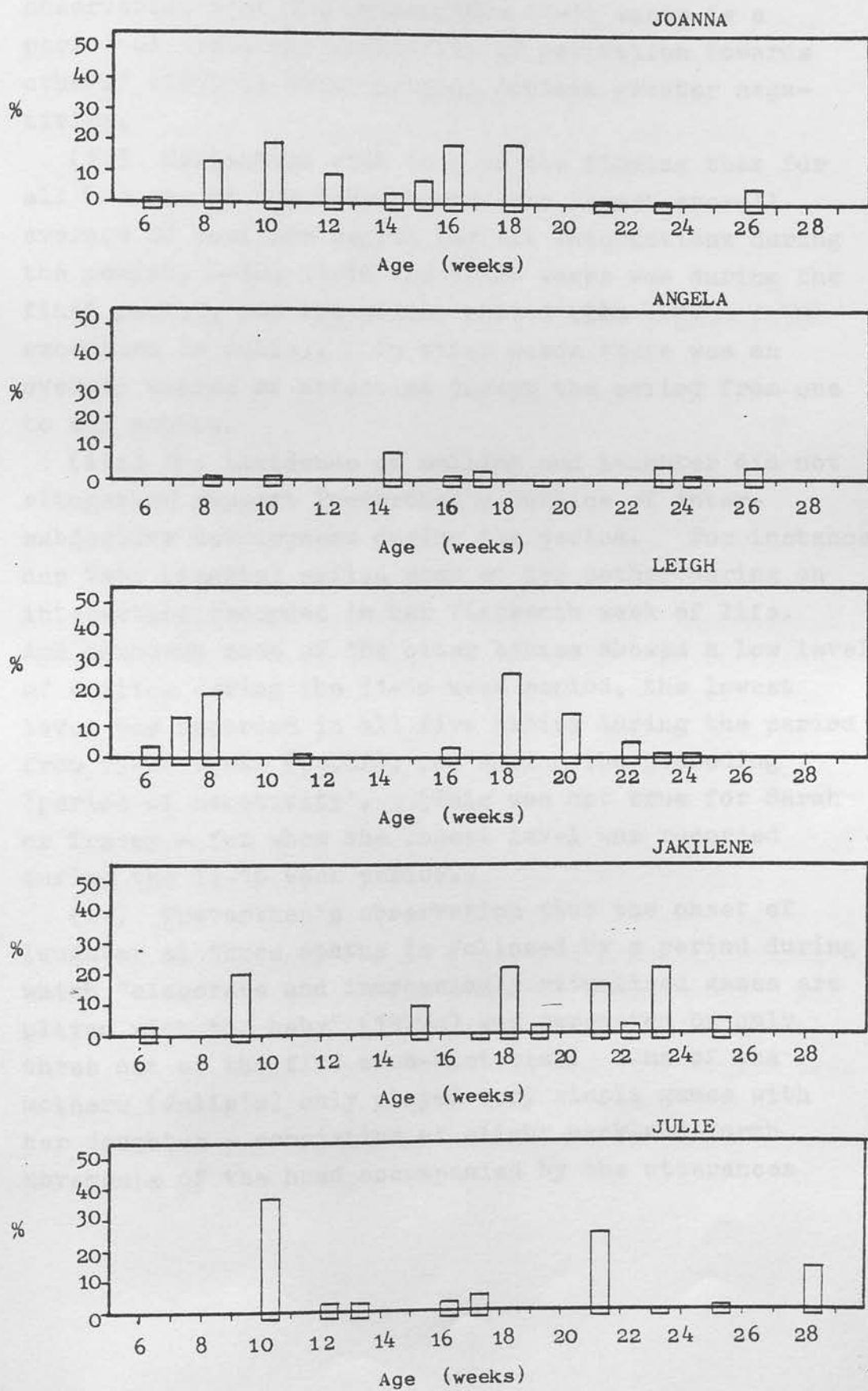


FIGURE 6/4 : Variations in smiling at mother by five babies
between six and twenty-eight weeks of age.



this occurring by chance is less than three in a hundred. Insofar as not looking at a cointeractant represents negativity, this goes against Trevarthen's observation that the period from 11-16 weeks is a period of "relative negativity of motivation towards others" (1979c): other periods contain greater negativity.

(ii) Consistent with this is the finding that for all but one of the seven babies the lowest overall average of positive regard for all interactions during the periods 6-10, 11-16 and 17-26 weeks was during the final period, not the middle period (the exception is Julie). In other words there was an overall waning of attention during the period from one to six months.

(iii) The incidence of smiling and laughter did not altogether support Trevarthen's outline of intersubjective development during the period. For instance, one baby (Angela) smiled most at her mother during an interaction recorded in her fifteenth week of life. And although some of the other babies showed a low level of smiling during the 11-16 week period, the lowest level was recorded in all five babies during the period from 17-26 weeks ($p=.02$), not during the preceding 'period of negativity'. (This was not true for Sarah or Tracey - for whom the lowest level was recorded during the 11-16 week period.)

(iv) Trevarthen's observation that the onset of laughter at three months is followed by a period during which "elaborate and increasingly ritualised games are played with the baby" (1979c) was supported by only three out of the five case-histories. One of the mothers (Julie's) only played very simple games with her daughter - consisting of slight back-and-forth movements of the head accompanied by the utterances

"Aa-boo! Aa-boo!" (or a variation, such as "Aa-boo-boo-boo-boo-boo-boo!") and the occasional 'raspberry'. The nearest Angela's mother came to playing games with her was one (interrupted) version of 'this little piggie went to market' - otherwise she did not play games at all. [These observations, like Trevarthen and Hubley's (1978), do not necessarily apply to interactions outside the recording-studio.]

(v) A more general finding was that, with the exception of a universal decline in positive regard after ten weeks of age, there was always an exception to any summarising statement made about these babies' behaviour. In a group numbering only seven, this suggests that the trends Trevarthen describes are not universally true.

There were a number of other findings:

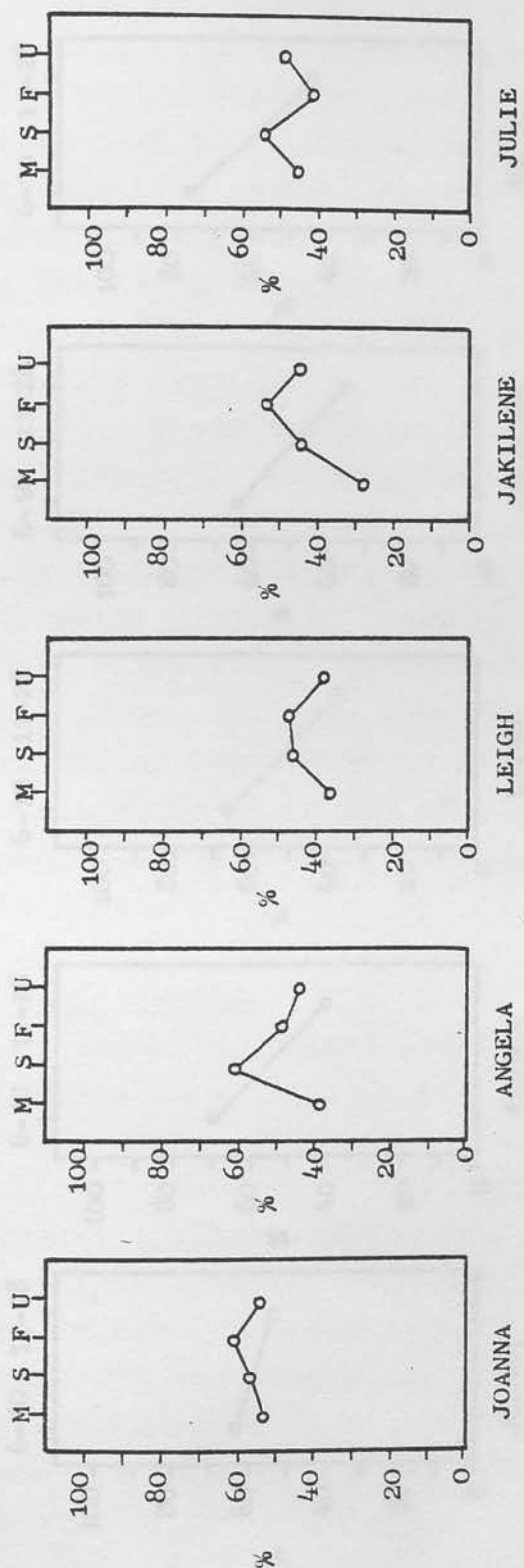
(i) If the figures for all sessions are summed, all the babies smiled more at people (their mother and strangers) than at the masks. Four of them smiled more at their mother than in any other condition (the exception was Angela). Four of them smiled more at the unfamiliar mask than at the familiar mask (Fig. 5b: the exception was Joanna).

(ii) There was a decline in overall attention after the age of ten weeks. This was true in all five babies taken individually (Fig. 6a). It was also true of all five babies for each condition taken individually (except that Joanna's score with the familiar mask was exactly the same before and after ten weeks: Fig. 6b).

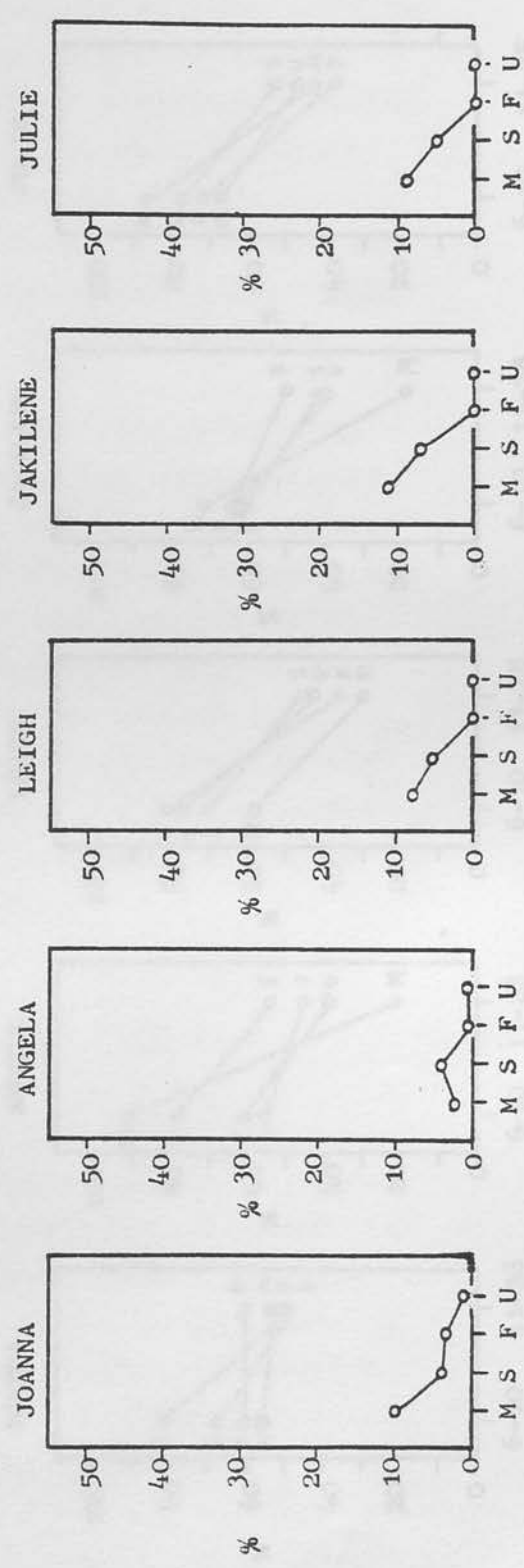
(iii) There was a high level of positive regard (and visual attention per se) paid to the masks. On average they were looked at more than the people when the study was taken as a whole (48.9% vs. 46.9%): this

FIGURE 6/5 : Behaviours directed at four different stimuli by five babies - summed for all sessions recorded between six and twenty-eight weeks of age.

a. Looking



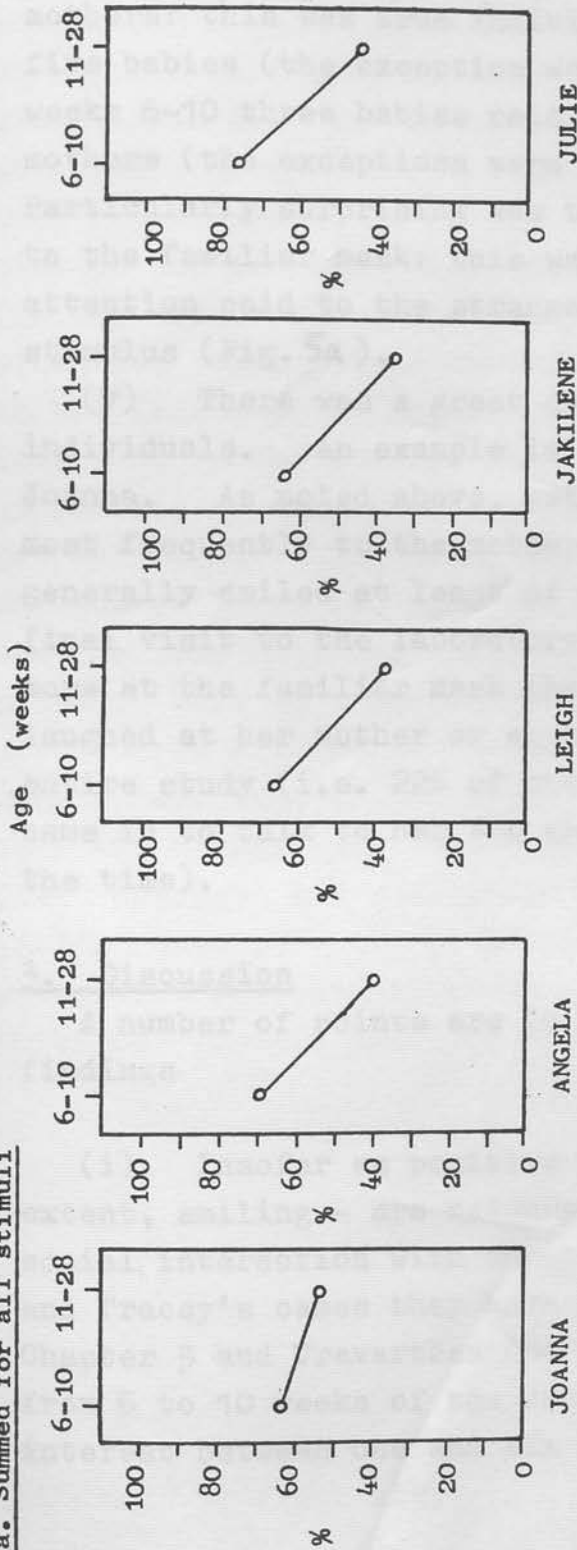
b. Smiling



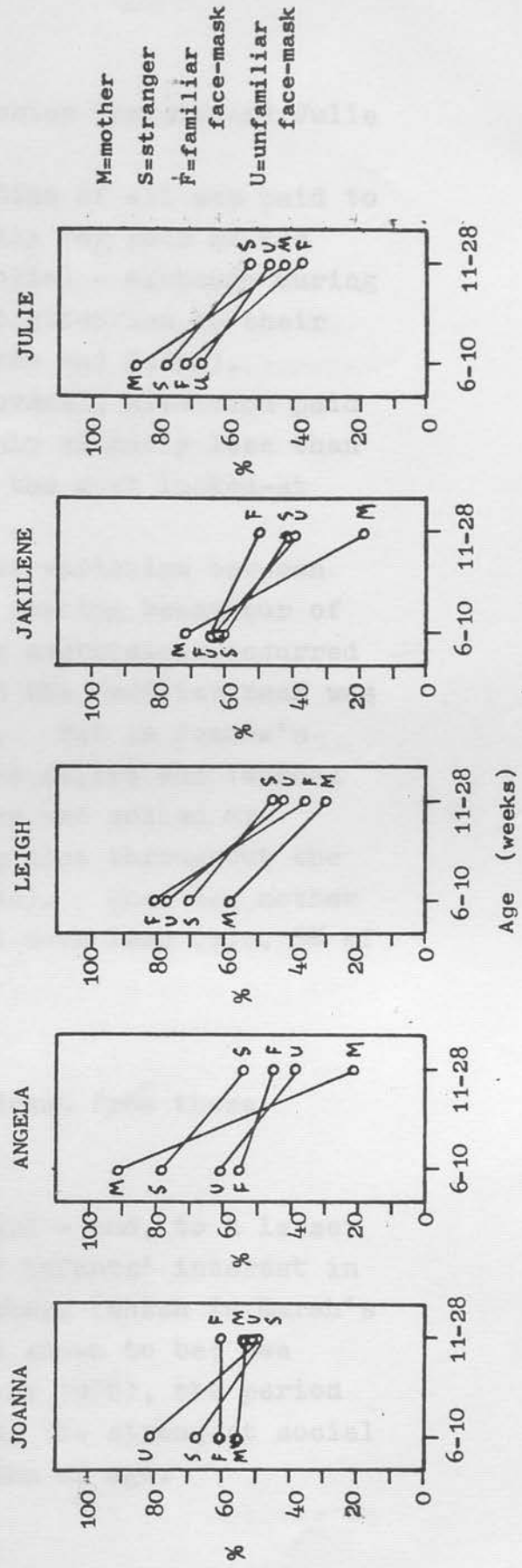
(M=mother ; S=stranger ; F=familiar face-mask ; U=unfamiliar face-mask)

FIGURE 1 : Attention to four experimental stimuli by five babies between 6-10 weeks of age and between 11-28 weeks of age.

a. Summed for all stimuli



b. For each different stimulus



was true individually of three babies (Angela and Julie were the exceptions).

(iv) On average, least attention of all was paid to mothers: this was true individually for four of the five babies (the exception was Julie) - although during weeks 6-10 three babies paid most attention to their mothers (the exceptions were Joanna and Leigh). Particularly surprising was the overall attention paid to the familiar mask: this was only slightly less than attention paid to the stranger - the most looked-at stimulus (Fig. 5a).

(v) There was a great deal of variation between individuals. An example is the smiling behaviour of Joanna. As noted above, smiling expressions occurred most frequently to the mother and the familiar mask was generally smiled at least of all. But in Joanna's final visit to the laboratory, she smiled and laughed more at the familiar mask than she had smiled or laughed at her mother or anything else throughout the entire study (i.e. 22% of the time). When her mother came in to talk to her she smiled much less (i.e. 5% of the time).

3. Discussion

A number of points are to be drawn from these findings

(i) Insofar as positive regard - and, to a lesser extent, smiling - are measures of infants' interest in social interaction with their mothers (which in Sarah's and Tracey's cases they have been shown to be; see Chapter 5 and Trevarthen and Hubley 1978), the period from 6 to 10 weeks of age contains the strongest social interest between one and six months of age.

first sight. It appears that the decline in

(ii) In line with predictions from the discrepancy hypothesis, the present study did show a decline in attention to the mother's face between two and four months and a relative increase in attention to the stranger's face over the same period so that, for the study taken as a whole, more attention was paid to the stranger's face than to anything else. But the discrepancy hypothesis would predict that the trend of attention to the familiar mask should be similar to that for the mother - but that the mask should get less attention overall than the mother's face because it is the less complex stimulus. This prediction is disconfirmed by the present study: for example, when the proportion of time spent looking in each condition for each session is ranked from 1 (large) to 4 (small), the sum of ranks for Jakilene and Julie is lowest for the familiar mask and highest for the mother (Table 3; p.194). This is a paradoxical finding when the perceivable differences between masks and people are considered: the mothers' faces were not only larger than the masks, they were more detailed, they moved, they vocalised and they acted contingently upon the babies' actions - all of which have been shown to be attractive stimulus-properties in experimental studies on visual preference

(e.g. Carpenter 1974, Haith 1966, Hutt et.al. 1968, Watson 1972, Papousek and Papousek 1977). A route out of this paradox is suggested by Cohen's (1973) important finding that "attention-getting" and "attention-holding" are controlled by different processes in infancy. The research which supports the discrepancy hypothesis comes from experiments on attention-getting, usually considering behaviour samples of less than a minute whereas, in this study, behaviour was recorded for, on average, four and a half minutes. This means that our findings concern the attention-holding properties of faces and face-like stimuli and cannot be explained by the discrepancy hypothesis.

(iii) Another explanation for the finding that the mother's face received on average less attention than any other stimulus might be given in terms of arousal. But low attention to the mother's face cannot be explained as the product of hypo-arousal caused by over-familiarity - as this should also affect behaviour with the familiar face-mask. Similarly, if it were explained as the product of aversion through hyper-arousal (Chance 1962), it would be difficult to understand why the stranger's face received so much attention.

One possibility might be that, for some reason, mothers do become uncomfortably arousing stimuli after ten weeks of age, as reported in a case-study by Stern (1971 1977) for example. But, if this were the case, one would expect there to be consistent patterns of attention for different mother-baby pairs from week to week (as found by Stern). This was not found. While low attention to the mother was a general phenomenon, there was great variation in the amount individual mothers were looked at - not only from week to week

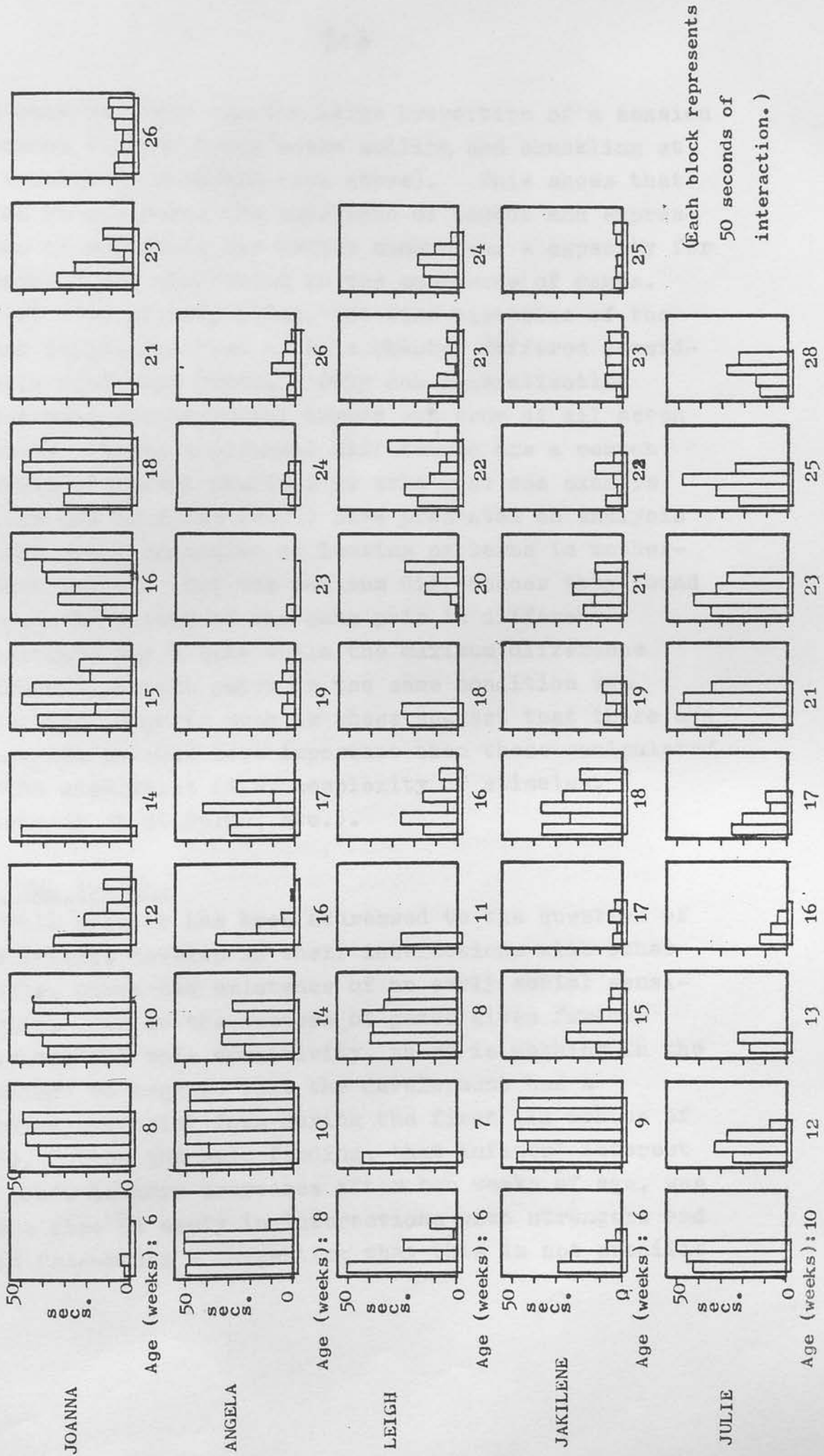
(Fig. 3) but from minute to minute within the same interaction (Fig. 7). Our findings suggest that the changes in the infants' interactive behaviour after ten weeks of age must have been self-determined to a large extent.

(iv) From the observations made during this study it appears that Trevarthen's statements about the importance of games after 16 weeks of age should be reassessed. But while games did not play an important part in the interactions of two of these mother-baby pairs (as recorded in the laboratory), it often seemed that games were one of the most successful ways of interacting with an otherwise fractious baby after four months of age. For instance Angela, whose mother never played games with her in the laboratory, would look and smile at a stranger who did play games with her. (A detailed example of interactive success achieved by game-playing is given on pp. 248-252 below.) On the other hand, babies were not always amused when people tried to play games with them, as is illustrated by the following excerpt of maternal babytalk:

"Aow! Aow! (Laughs) (Kisses) (Sucks baby's fingers) Ber-ber-ber! Ber-ber-ber-ber-ber!
Ber-ber-ber-ber! Ba-ba-ba-ba! (Sucks baby's fingers) Oh no, you don't want that game. What game do you want?" (Sarah: aged 20 weeks).

What these observations suggest is that babies do become more easily involved in games at around four months of age than hitherto; but that game-playing is a manifestation rather than a cause of their changing intersubjective status. Other pointers in this direction were that, after four months of age, babies quite often smiled and chuckled at their mothers even when no game was being played (see pp. 243-245 below)

FIGURE 6/7 : Variations in looking at mother by five babies during successive 50-second periods of mother-infant interactions recorded between six and twenty-eight weeks of age.



and that one baby spent a large proportion of a session recorded at twenty-six weeks smiling and chuckling at an inanimate face-mask (see above). This shows that games do not cause the emergence of humour and expressions of enjoyment but rather humour and a capacity for enjoyment are manifested in the emergence of games.

(v) As already noted, the case-histories of the seven babies reported in this chapter differed considerably from each other. Only one generalisation concerning developmental trends was true of all seven babies. Large individual differences are a common feature of infant studies: to take just one example, Collis and Schaffer (1975) have presented an analysis of the synchronisation of looking patterns in mother-infant pairs. But the maximum differences they found between behaviour of the same pair in different conditions was $X\ 3.84$ while the maximum difference between different pairs in the same condition was $X\ 36.11!$ Figures such as these suggest that there are processes at work more important than those manipulated in the experiment (i.e. complexity of stimulus, animation of stimulus, etc.).

4. Conclusions

This chapter has been addressed to the question of how infants develop in their interactions with other people, given the existence of an early social sensitivity. While the success of games gives further evidence for this sensitivity, there is nothing in the findings to suggest that the development has a particularly social form during the first six months of life. Thus the main finding, that infants' interest in their mothers decreases after ten weeks of age, was found also to apply in interactions with strangers and with face-masks - suggesting that this is not specific

to the development of the mother-infant relationship but more the product of the infant's intrinsic developmental programme.

Because of the simplicity of the behavioural indices used for analysis in the main study, it includes no positive evidence of negativity. But, generally, the results can be explained by an increase with age in the infants' capacities for being active: for example, the facts that their visual capacity rapidly develops, reaching adult levels of competence at approximately four months of age (Haith 1977) and that their ability to grasp and control reachable objects also improves markedly during this period (White et.al. 1964). These developments would naturally increase the infants' interest in exploring their surroundings and, thus, decrease the amount of attention they paid to the experimental stimuli. The relatively low proportion of attention paid to mothers would reflect a conflict of purposes: the mother, having been instructed to entertain her daughter would see the baby's increasingly active investigations of the surroundings as counter-productive and attempt to frustrate them. The baby, thus frustrated, would, through innate obstinacy or 'negativity', make more persistent attempts to evade her mother's attentions. In these terms, the strangers would fare better than the mothers because, in the first place, they would have 'novelty value' and, secondly, because they would be less assertive and, therefore, less frustrating than the mothers. The masks would fare better simply because they 'allowed' the babies to investigate what they wanted.

Such an explanation is compatible with the variability in the infants' behaviour - this would simply reflect their changes in interest ('moods'). It would

also explain their enjoyment of games, insofar as these permit the infants to become more actively involved with, and thus discover more about, their cointeractants' behaviour than is possible when adults adopt a more mature 'conversational' mode of interaction.

Due to the simplicity of its analytic basis, the present study cannot support the explanation just proposed for its findings. For this reason, more detailed analyses were undertaken of the video-records upon which it is based. These analyses focus particularly on the question whether or not the decline with age of infants' interest in their mothers' faces was due to an increase in purposeful 'negativity'. The findings are reported in the next chapter.

That the decline in attention might be particularly marked with mothers because mothers, in more assiduously following the experimenter's instructions to 'chat with' their babies, would be more likely than strangers (or sibs) to obstruct their infants' investigations of their surroundings - those obstructions leading to active negativity on behalf of the babies. Such an argument depends not only on the demonstration that young infants are capable of negativity. It presupposes, more generally, that infants are capable of purposive action. Both assumptions are important theoretically.

The most influential theories of early negativity are derived from psychoanalysis and stress the importance of conflict. For example, Spitz suggests that infant negativity or 'unpleasure' is the product of frustration caused by a conflict between the infant's wishes and external circumstances. But as well as to argue that environmental frustration is detrimental for developmental progress because it leads to impaired

'reality-testing'.

A precondition for setting up reality-testing is that objects shall have been lost which once brought real satisfaction (Freud 1925) ... It follows that to deprive the infant of the effect of displeasure during the first year of life is as harmful as to deprive him of the effect of pleasure ... The importance of frustration for developmental progress cannot be overestimated (Freud 1925).

Chapter 7: NEGATIVITY IN EARLY INFANT-MOTHER EXCHANGES

The previous chapter concluded with an argument that the fall in infants' attention to experimental stimuli after ten weeks of age might be due to their maturing abilities to take an increasingly active interest in other aspects of their surroundings. It was suggested that the decline in attention might be particularly marked with mothers because mothers, in more zealously following the experimenter's instruction to 'chat with' their babies, would be more likely than strangers (or masks) to obstruct their infants' investigations of their surroundings - these obstructions leading to active negativity on behalf of the babies. Such an argument depends not only on the demonstration that young infants are capable of negativity. It presupposes, more generally, that infants are capable of purposive action. Both assumptions are important theoretically.

The most influential theories of early negativity are derived from psychoanalysis and stress the importance of conflict. For example, Spitz suggests that infant negativity or 'unpleasure' is the product of frustration caused by a conflict between the infant's wishes and external circumstances. But he goes on to argue that environmental frustration is essential for developmental progress because it leads to improved

'reality-testing':

"a precondition for setting up reality-testing is that objects shall have been lost which once brought real satisfaction (Freud 1925) ... It follows that to deprive the infant of the effect of unpleasure during the first year of life is as harmful as to deprive him of the effect of pleasure ... The importance of frustration for developmental progress cannot be overestimated." (Spitz and Cobliner 1965)

A rather different argument is put forward by Melanie Klein (1953b). She suggests that infant negativity is primarily the product of an internal conflict - between the self-destructive 'death' instincts and the self-preservative 'life' instincts. Although she stresses that negativity is related by the infant to his or her environment, she sees it as being essentially a defensive projection of innate hate and aggressivity which will occur in the early stages of infancy whatever the infant's circumstances.

Despite their differences, both Spitz and Klein see the transcendence of negativity as playing a necessary part in developmental progress - whether it be achieved by more mature reality-testing or by working through the 'depressive position' (see Chapter 1). This view contrasts markedly with the view put forward by some attachment theorists. For example, Ainsworth, Bell and Stayton (1974) argue that negative behaviours such as fussiness and disobedience are an avoidable consequence of inappropriate or insensitive mothering techniques. In contradiction to Spitz, they argue that, while negativity is a consequence of frustration by external circumstances, it is developmentally retrograde. In a 'good-enough' (Winnicott 1960a) environment, negativity will not occur and the infant will grow up into a naturally obedient and easy-going

child.

These different theories lead to different predictions about the occurrence of negativity in infancy. Spitz (1957) for example, did not believe that truly purposeful negativity could be observed until eight or nine months after birth. This view corresponds to that held by attachment theorists. As reported in Chapter 1, attachment theorists discuss only the positive aspects of the neonate's behavioural repertoire; those behaviours which permit him or her to form a bond with the mother. Behaviours which might disrupt or weaken social relationships are not discussed as such until babies are more than six months old and, even then, the main interest is in negativity towards strangers (e.g. Bowlby 1969, Ainsworth and Wittig 1969, Rheingold and Eckerman 1973, Solomon and Decarie 1976). Klein (1953a), on the other hand, reports that, in accord with her theory, negativity occurs from birth, and she offers informal evidence that even very young babies will refuse to suck in the feeding situation, struggling and screaming in protest against their mothers' attentions.

1. Empirical reports of negativity

In the light of the theoretical controversies surrounding early negativity one might expect it to have provided the topic for numerous empirical studies. Until recently this was not the case. Nevertheless, the literature contains many incidental reports of early negativity. With respect to the characteristic forms of negativity, these reports have a good deal in common. Thus Brazelton et.al. (1974) - who report that babies as young as one month old naturally oscillate between approach and withdrawal during interactions with their mothers - claim that, during the

negative part of the cycle, babies use four strategies:

- "1. Actively withdrawing from the mother - that is, increasing the physical distance between the stimulus and oneself by changing one's own position, for example, arching, turning, shrinking.
- "2. Rejecting it (i.e. the stimulus of the mother's face), that is, dealing with it by pushing it away with hands and feet while maintaining one's position.
- "3. Decreasing its power to disturb by maintaining a presently held position but decreasing sensitivity to the stimulus - looking dull, yawning or withdrawing into a sleep state.
- "4. Signalling behaviour, for example, fussing or crying, which has the initially unplanned effect of bringing adults or other caregivers to the infant to aid him."

A larger-scale study by Stechler and Carpenter (1967) shows that guided turning-away from the face occurred in all fourteen babies they studied between the ages of two and six weeks, reaching a peak at two or three weeks. They describe these withdrawals of attention as having a "dramatic and apparently controlled quality". It took various forms:

"lowering of the eyes, lids, prolonged closing of the eyes, turning the head toward the periphery of the target, with each of these behaviours interspersed with target orientations whose brevity and precipitous cessation suggest a check in the stimulus field which may then result in further avoidance. The most extreme behaviour is a turning of the whole body so that the head is rotated 80° into the side-pillow, often with a rigidly arched back and fussing."

As mentioned in Chapter 1, similar behaviour was reported by Brackbill (1958) in an experiment concerned with the instrumental conditioning of smiling. The subjects (S) were four-month-olds and the reinforcement

consisted of social and body contact with the experimenter (E). Brackbill's first finding was that, after the cessation of regular reinforcement, the infants' rate of smiling extinguished not to their previous operant rate, but to zero. And

"coincident with the beginning of zero response rate was a conspicuous behavioural change: S would no longer fixate the discriminative stimulus (E's face). Instead, S's head turned to one side and remained there - an occurrence that was in distinct contrast to S's persistent fixation during conditioning. When this occurred, immediately preceding the last extinction interval, E propped S's head with rolled blankets or other material, making it impossible for the infant to turn his head to the left or right more than a few degrees. The 'refusal' to fixate persisted even under these conditions; S's eyes then turned toward the ceiling."

In another experiment, Polak, Emde and Spitz (1964) used the smiling response to indicate the onset of depth perception. They discovered that one of the ways infants differentiated between a photograph of a face and a real face was an "apparently purposeful turning away of the eyes and head". This

"was a common response to the human face in the three to five months age group. Preliminary data on this response suggest a peak of frequency of occurrence of turning away in the third and fourth months."

Their subjects turned away more frequently from the real face than from the photograph.

While varying in detail, these reports suggest that negativity is a distinct type of action occurring from the earliest stages of infancy. But, despite the consensus as to its form, there is some disagreement as to how negativity should be interpreted. For example, Brazelton et.al. (1974) argue that the behaviours they

observed were not so much a product of the quality of stimulation presented by the mother - as originally suggested by Schneirla (1965) - but of a "basic regulatory mechanism", akin to that which maintains homeostasis in physiological parameters such as body temperature, allowing infants to maintain some control over visual stimulation. Stern (1971 1977) and Stechler and Carpenter take a similar view, suggesting that gaze aversion and all its accompaniments are methods of limiting visual stimulation to manageable proportions:

"it appears that the very young baby has to regulate intake or confrontation in relation to his developing schemas. The frequent almost surreptitious glancing back at the target while holding the head averted [cf. 'fractional glances', p.233 below], would support the idea that in some way he knows that the stimulus is there, that he is drawn to it, but can handle it only in small doses." (Stechler and Carpenter 1967)

The use of physiological concepts, such as homeostasis and arousal, and statements that negative behaviours are affected by the quantity but not the quality of the visual stimulation to which infants are exposed, suggests that early negativity is an automatic process which does not involve the infant's purposes. This view has been seriously challenged by a series of studies which show that infant negativity can be experimentally controlled (e.g. Tatam 1974, Brazelton et.al. 1975, Tronick et.al. 1979, Murray 1980).

For example, Murray (1980) has found that, by asking mothers to go blank-faced during mother-infant interactions, two-month-olds are made to stop smiling, avert gaze from the mother's face, show facial expressions of distress, peculiar grimaces of the mouth, increased handling of the clothes, touching the face, sucking the

thumb or fingers, and crying. As reported in Chapter 1, Murray has also shown that differences emerge from comparisons between infants' behaviours when interacting with their mothers in 'live' closed-circuit television and the behaviours of the same infants when watching a replay of their mothers' behaviour. In the second condition, when - while being visually identical - the mothers' behaviours are not coordinated with the behaviours of their babies, the babies will more often turn away from the TV-image "looking puzzled and frowning, making more prolonged grimacing movements, touching their clothes and face and yawning more often."

These results show that negativity is related to the quality of stimulation to which infants are exposed and is not an automatic response to perceptual overload. But why do babies find their mothers aversive when the normal structure of mother-infant interaction is changed? The simplest proposal is that infants have an expectation that people will interact with them when in a position to do so and that, when this expectation is violated, negativity will occur. However, some workers claim, on the basis of earlier experimental work with non-social stimuli (e.g. Papousek 1969, Watson 1972), that these results provide further evidence for the existence of "a fundamental cognitive response system" which underlies all infant behaviour, having as its aim the comprehension and control of all environmental stimulation (Papousek 1975, Watson 1977). In terms of this hypothesis, pleasure results from increased control or comprehension and displeasure results from incomprehension or reduced control over the environment. Thus, because the experimental perturbations of mother-infant interactions have effects which are incomprehensible to the baby and thus reduce

or eliminate the social efficacy of their behaviours, distress results. On the other hand, normal mother-infant interaction gives infants pleasure simply because it enables them to learn about and thus gain control over a fertile source of environmental stimulation.

Murray argues against the view put forward by Papousek and Watson on the basis that, if one takes the form of infants' expressions into account, their negative reactions appear to be "protests or solicitations for responsiveness". She also reports that there is a marked difference between infants' reactions when their mothers go blank-faced and when interaction with their mothers is naturally interrupted by the entrance of a second adult who engages the mother in conversation - distress being much less apparent in the latter condition. However, Murray's view is not incompatible with Papousek's and Watson's so long as one accepts that: (a) it is babies rather than 'cognitive response systems' who naturally seek to increase their understanding and control over the environment - expressing distress when their control is reduced - and, (b) as argued in Chapter 5, that babies have a natural understanding of or sensitivity to personal interaction. In these terms, the 'blank-faced' behaviour of mothers is more distressing to infants than natural interruptions because blank-facedness is more incomprehensible to infants than is interruption. This also means that what Papousek and Watson refer to as a 'fundamental cognitive response system' should be seen as a psychological formulation of what is called 'will' in philosophical circles (e.g. the individual's natural endeavour to preserve his or her own being and to increase his or her power of self-maintenance; Spinoza 1910). Thus, on the basis of

experimental work on interruptions of infant-adult exchanges, we might conclude that negativity results from the frustration of infants' wills.

While all the evidence reviewed above - with the possible exception of Brazelton et.al.'s (1974) - is compatible with this conclusion, it has one important limitation: it is all experimental evidence. This means that we still do not know what role negativity plays in normal development. We know that, experimentally, young infants can be made to express negativity. But do they express negativity under normal circumstances? And, if so, is it of the same sort as that produced in experimental circumstances? The following section of this chapter presents some detailed examples of naturally-occurring negativity as observed in the studies reported in Chapter 6.

2. Analysis

a. Interactions potentially including negativity on behalf of the baby were initially identified by analysis of mothers' babytalk. The categories for this analysis have been devised by Lynne Murray (1980) in the course of her study of mothers interacting with their babies via closed-circuit television. Her purpose was to discover whether mothers' babytalk showed any change when, after interacting with their babies 'live', they were re-shown a recording of their baby in interaction with them. Her rubric (with slight modifications) is as follows:

(1) Avoiding: the mother states explicitly that the baby is not interacting with her or is interacting with her negatively;

e.g. "You're ignoring me again",
"You're fed up with me".

(2a) Attending elsewhere: explicit statements about the infant's attention having been focussed on something other than the mother and to the exclusion of interaction with her or questions to verify whether or not this is the case. (2a utterances are often similar to those in 1 except employing a question form.)

e.g. "Are you not speaking to Mummy?",
 "You're too interested in your fists".

(2b) Implied 2a: the infant's attention is presumed to be on something or person other than the mother and therefore, by implication, not on the mother.

e.g. "I think you're looking at your fingers",
 "Come on, look at me",
 "What do you see?".

(3) Negative mood: the mother feels the infant is in a state or mood or preoccupied in a way which is interfering with positive interaction or asks whether this is the case.

e.g. "Are you fed up with this game?",
 "It's too hot?",
 "Oh, you're being a wee bit sick again",
 "Are you uncomfortable?".

(4) Explanations: utterances which implied that the mother knew that the baby's overall evaluation of her was negative or suggested other general reasons which would make the infant's negative behaviour 'natural'.

e.g. "I'm a bad mother",
 "You're gonna tell me what a grim life you have?"
 "You'll probably be happier on your own".

Judgements were made as far as possible without reference to context, by turning off the video-picture and listening to the sound only, so that results might be reproducible.

Utterances such as "Are you?" in the sequence: "You're gonna have a grizzle. Are you? You're gonna have a grizzle", were not coded as 'rejected' (Cat.3) because their meaning could not be coded independently of their context. In the same way comments such as "Have you not got any stories for your Mummy?" were excluded from the analysis because logically one may communicate positively without doing it by telling stories - even though, in effect, such comments seemed almost interchangeable with comments like: "Are you not going to talk to your Mummy?"

(Inter-observer reliability was calculated for all five categories, using the formula given in Chapter 3: all scores were over .85 except Category 4 (.74)).

In Murray's study, her categories showed a distinct and statistically significant difference in the mothers' babytalk when talking to their baby via television and when talking to a recording of their baby. Mothers made more comments indicating that they felt their babies were not communicating with them in the latter condition than in the former condition. As the babies were not and could not be communicating with them in the latter condition, Murray's finding suggests that her categories of maternal speech are valid as indicators of failure of infant response.

In this study, it was decided to focus initially on Category 1 comments, as these were the clearest evidence for negativity. However, as shown in Tables 1-6, only two of the mothers made this type of comment (Sarah's and Joanna's). All the interactions in which they occurred were analysed, but, so that our sample should not be unduly limited, some other examples were also sought in interactions during which the mother (or stranger) received significantly less attention than the other stimuli during the same recording session.

TABLES 7/1-6: Showing the proportion of maternal utterances per session which indicated that the mother felt her daughter was not communicating with her positively

TABLE 7/1: Sarah's Mother

Session	Total Utterances	CATEGORY				Sub-Total	% of Total
		Cat.1	Cat.2a	Cat.2b	Cat.3	Cat.4	
1	283	2	5	9	27	4	16.61
2	233		4	15	27	4	21.46
3	86		1		20	1	25.58
4	138	3		3	14		14.49
5	172		10	7	11	4	18.60
6	128	4	11	2	13	5	27.34
7	134	6	2	10	13	6	27.61
8	70			7		2	12.86
9	117			2	2		3.42
10	219	5	2	21	8		17.81
11	113			2	6		7.08
12	160	1	5	3	6	1	10.00
TOTALS	1853	21	40	81	147	27	316
% of GRAND TOTAL		1.13	2.16	4.37	7.93	1.46	17.05

TABLE 7/2: Joanna's Mother

Session	Total Utterances	CATEGORY					Sub-Total	% of Total
		Cat.1	Cat.2a	Cat.2b	Cat.3	Cat.4		
1	105	2	9	15	12		38	36.19
2	102		4	2	4		10	9.80
3	140	1	6	5	16		28	20.00
4	207	1	3	13	21		38	18.36
5	57		4	2	25		31	54.39
6	299	2	18	19	30	2	71	23.75
7	180	1	11	18	14		44	24.44
8	150		1	7	8		16	10.67
9	35	1	1		4		6	17.14
10	129		2		14		16	12.40
11	185	4	5	6	9		24	12.97
TOTALS	1589	12	64	87	157	2	317	
% of GRAND TOTAL		0.75	4.03	5.48	9.88	0.12		19.96

TABLE 7/3: Angela's Mother

Session	Total Utterances	CATEGORY				Sub-Total	% of Total
		Cat.1	Cat.2a	Cat.2b	Cat.3	Cat.4	
1	99		5	4	4		13.13
2	154			6	15		13.64
3	152			4	9		8.55
4	164			2	5		4.27
5	153		1	11	7		12.42
6	190		1	12	5		9.47
7	128			6	18		18.75
8	128		3	11	5		14.84
9	167		3	19	6		16.77
TOTALS	1235	0	13	75	74	0	
% of GRAND TOTAL		0	1.05	6.07	5.99	0	13.12

TABLE 7/4: Leigh's Mother

Session	Total Utterances	CATEGORY				Sub-Total	% of Total
		Cat.1	Cat.2a	Cat.2b	Cat.3	Cat.4	
1	144			7	18		17.36
2	43			6			13.95
3	175			2	9		6.29
4	49				11		22.45
5	167			22	13		20.96
6	78			3			3.85
7	115			3			2.61
8	153			1	3		2.61
9	280			13	6		6.79
10	80				1		1.25
TOTALS	1284	0	0	57	61	0	118
% of GRAND TOTAL		0	0	4.44	4.75	0	9.19

TABLE 7/5: Jakilene's Mother

Session	Total Utterances	CATEGORY				Sub-Total	% of Total
		Cat.1	Cat.2a	Cat.2b	Cat.3	Cat.4	
1	94			24			24 25.53
2	172			9			9 5.23
3	156			6			6 3.85
4	109		2				2 1.83
5	157			25			25 15.92
6	99			13	1		14 8.92
7	120			8	1		9 7.50
8	97			2			2 2.06
9	153			3			3 1.96
10	104			4			4 3.85
TOTALS	1261	0	2	104	2	0	108 12.60
% of GRAND TOTAL		0	0.16	8.25	0.16	0	8.57

TABLE 7/6: Julie's Mother

Session	Total Utterances	CATEGORY				Sub-Total	% of Total
		Cat.1	Cat.2a	Cat.2b	Cat.3	Cat.4	
1	87			11			11 12.64
2	162			32			32 19.75
3	81			9	7		16 19.75
4	21				2		2 9.52
5	145			23			23 15.86
6	154			10	2		12 7.79
7	118				4		4 3.39
8	123			17			17 13.82
9	93			9			9 9.68
TOTALS	984	0	0	111	15	0	126
% of GRAND TOTAL		0	0	11.28	1.52	0	12.80

b. In all, sixteen interactions potentially including negativity were analysed in detail. In the course of these analyses a number of different patterns of movement were identified as expressions of negativity. These were:

(i) Gaze aversion; when the baby spent a disproportionately short time during an interaction looking at her mother. This might be of two types - passive and active. Passive gaze aversion was when a baby spent a disproportionately long time staring at nothing in particular - a simple object or an area of the floor. Active gaze aversion was when the baby showed a disproportionately high visual interest in her surroundings, looking at everything but the mother.

(ii) A hunched posture; this was often associated with passive gaze aversion, where the baby would look at the floor, her own feet, her clothes or hands for long periods of time (self-regard) - looking at her mother only briefly or from under her eyebrows.

(iii) Active resistance to adult's coercion; this was often combined with (ii): when an adult attempted to coerce the child to make eye-contact, there would be a very visible attempt on the part of the child to resist it. (Hutt and Ounsted found similar behaviour in autistic children; 1970.)

(iv) Fractional glances; these are also described by Hutt and Ounsted in autistic children, who they found to collect visual information by means of peripheral vision, but also by "paranoid, darting looks": glances which usually last a fraction of a second only, which begin a fraction of a second after the co-interactant has looked away from the baby and end a fraction of a second after the other has begun to look back at her.

(v) Protesting vocalisations; usually of relatively low intensity (i.e. not continuous and not loud) and suggesting frustration in that a simple change of stimulus makes them cease. These appear homologous with the vocalisations in ten-month-olds described by Zelazo et.al. (1975) which they found to be a product of boredom as opposed to excitement.

(vi) Facial expressions; typically babies would adopt a fixed, 'blank', non-smiling expression if not crying. When crying they would not infrequently protrude their lower lip in an expression commonly described as a 'pout' or 'pet lip' by Edinburgh mothers and used by them as an indication of 'temper' as opposed to a genuine grievance (see Photo. 61). Occasionally this 'pet lip' expression would occur without crying - associated with an angry or otherwise 'blank' face. (cf. Ekman and Friesen 1975, Eibl-Eibesfeldt 1975.)

(vii) Trunk movements; including threshing and struggling movements and back-arching, as reported by Schaffer and Emerson (1964b), Thoman (1975), Brazelton et.al. (1974) and Trevarthen (1978).

(viii) Biting; one instance of apparently intentional biting was recorded, when the baby (Angela) moved her mouth towards the mother's thumb, the mother let her take it in and the baby bit it. Melanie Klein would probably view this as a symbolic attack on the bad breast (oral aggression); but, however one views it, it certainly proved painful for the mother: "There we are. Are you having a look around? Ouch!! (Self-conscious laugh) You nearly bit my finger!" (Angela aged 23 weeks)

(ix) Comparisons; whether or not an action was an instance of negativity was often determined by comparing it with the infant's behaviour in the conditions recorded immediately before and after the interaction

PHOTO. 61 : A cry-face with 'pout' (Sarah, aged 13 weeks).

PHOTO. 62 : Angela 'hunched'.

PHOTOS. 63-64 : Mother's attempts to gain Angela's attention (Example 3i).

61



62



63



64



in question.

These various behavioural characteristics were found to be combined in various ways to constitute negativity. Four examples are given below.

3. Examples

(i) Angela (aged 23 weeks)

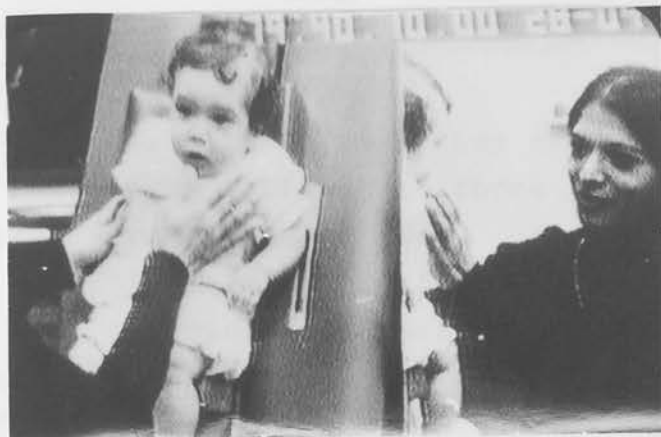
Evidence for negativity. Angela spent only 6% of this interaction looking at her mother. For 94% of the time she adopted a fixed hunched-up posture, looking at her feet or the floor directly below them (Photo. 62). While Angela did not cry, she did make frequent 'frustrated' whining grunts. She did not smile at all.

Evidence for selectiveness during the interaction.

Angela looked at her mother only nine times during this four and a half minute interaction. Two of these looks were 'fractional glances' (e.g. Photos. 65-67). Five of the remaining seven looks were concealed by the fact that, as Angela was so hunched forward, her eye-movements were almost invisible from where the mother was sitting - to such an extent that the mother tried bending down to look into Angela's face (see Photo. 63). When she did look at her mother, her looks were shot up from under her eyebrows and were very brief (average length (\bar{x}) = .9 seconds).

The mother tried a number of tactics to attract Angela's attention to her face. One was to bring her face down to Angela's level, as mentioned above. Another was to snap her fingers on a level with her own face (Photo. 64). A third was to remove the woollen boot at which she thought Angela was looking (Photo. 68). Babytalk: "What is it? You're looking at your bootees.

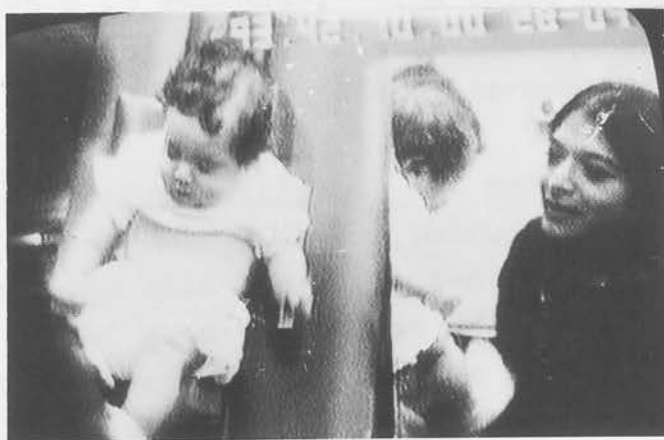
65



66



67



PHOTOS. 65-67 : A 'fractional glance' by Angela (Example 3i).

Let's take them off. Let's take them off. There. Yes." The fourth was actively to force Angela's head back so that they were face-to-face. Angela ignored or resisted all these attempts.

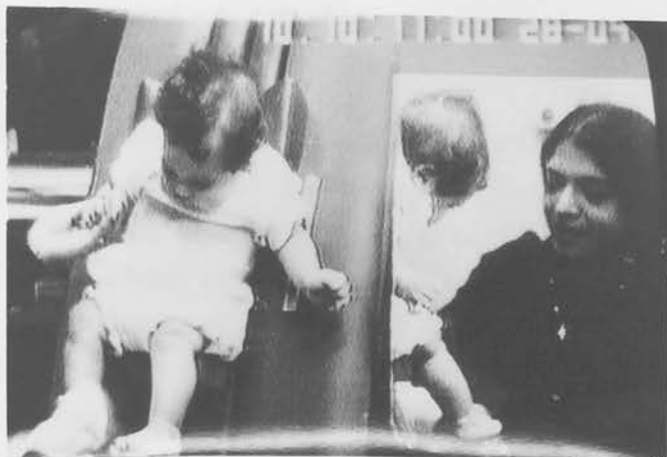
Angela's most obviously active refusal of her mother's overtures was in her struggle to avoid having her head lifted up to look at her mother. Her mother attempted this three times. Only once, the first time, was it at all 'successful' - in the sense that Angela did briefly look at her mother, although she almost immediately looked away (after 1.1 seconds) arching her back as she did so (see Photo. 69). The second struggle lasted 5.5 seconds, and even though the mother did manage to get Angela's head to an upright position, Angela hooded her eyes so that no eye-contact was made (Photo. 70). Babytalk: "Angela. Mummy's goin' - . Hello darling. There. Now you sit up properly. Be a good girl. What is the matter?" etc.

Interestingly Angela did look at her mother during this struggle but only while her mother was looking away (duration = .3 seconds). The third attempt was equally unsuccessful in that Angela immediately re-adopted her hunched position after her mother's attention, (Photos. -).

Contrast with other conditions. It seems unlikely that Angela's behaviour with her mother was simply a product of boredom with the experimental situation because the second greatest amount of attention was given in the final condition - to the familiar face-mask (FM). Furthermore, the mother was the only stimulus Angela did not smile at.

Nonetheless, it might still be thought possible that Angela was just more interested in her surroundings when with her mother than in the other conditions; perhaps, her mother's presence gave her the confidence

68



69



70



PHOTOS. 68-70 : Mother's attempts to gain Angela's attention - by
removing a woollen boot(68) and by coercion(69-70)
(Example 3i).

she would not otherwise have had to explore visually the room in which she was sitting. But, in fact, Angela looked around the room much more in the other three conditions than she did when with her mother. When visual fixations of entities other than the stimulus-object, her feet and the floor are summed (e.g. the mirror, pictures on the wall), it is found that such fixations were made much more frequently in the three non-mother conditions (i.e. between 7.3 and 10.4 times per minute) than during the interaction with her mother (i.e. 1.3 times per minute). And although Angela sometimes adopted a hunched posture in the non-mother conditions, she did so for much less than with her mother (M = 94%, S = 49%, FM = 14%, UM = 36%). Thus it cannot be argued that Angela had not sufficient postural control to right herself from a hunched position.

As soon as the experimenter entered the room at the end of the interaction with the mother, Angela sat up and looked at him and, subsequently, the familiar face-mask which replaced her mother (Photos. 71-73). She also ceased her frequent 'frustrated' vocalisations when her mother left the room. Having vocalised so much that there were no more than fifteen seconds of continuous silence during the interaction with her mother, Angela vocalised only twice in the 208 seconds after her mother had left the room.

Synopsis:

Order and lengths of conditions: Unfamiliar face-mask (UM: 347 seconds), Stranger (S: 280 seconds), Mother (M: 288 seconds), Familiar mask (FM: 295 seconds).

Proportions of visual attention: UM (26%), S (33%), M (6%), FM (28%).

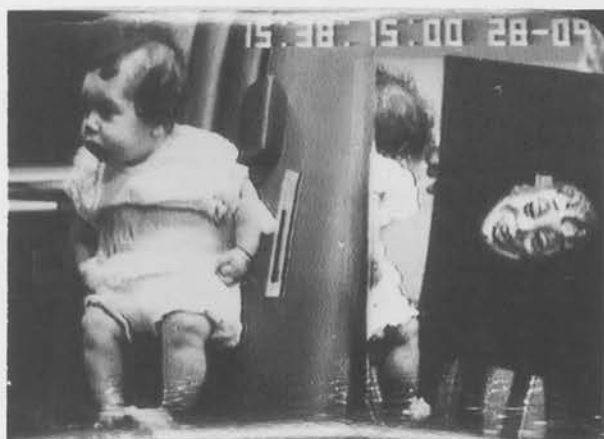
Proportions of smiling: UM (0.4%), S (0.2%), M (0%), FM (0.9%).

Proportions of crying: none throughout recording session.

71



72



73



PHOTOS. 71-73 : Transformation in Angela's posture and attention on the experimenter's entrance to the recording-studio (71) and the substitution of the mother by a familiar face-mask (Example 3i).

Conclusion

Angela's frustration during this recording session was particularly marked when she was with her mother. Although it is not easy to tell why this was it is interesting to note that Angela was very sensitive to changes in the 'normal course of events'. Thus her interest was immediately re-awakened when the experimenter interrupted her 'interaction' with her mother to replace her with a face-mask. Similarly, of the nine looks Angela did direct at her mother, seven were made immediately after maternal actions which contrasted with the normal run of conversational maternal behaviour (i.e. leaving and entering the room, bending down to look for a Kleenex, saying "Ouch!" after Angela had bitten her (see p. 234 above), bending down to wipe Angela's mouth and (twice) during the struggles caused by her mother's attempts to coerce visual contact). This suggests that if the mother had tried to do something which differed from the usual run of 'conversational' interaction - such as play a game - she might have been more successful in gaining Angela's attention (see Example (ii)).

(ii) Leigh (aged 20 weeks)

Evidence for negativity. In the first 100 seconds of this interaction, Leigh spent 8.1 seconds looking at her mother while the mother spent 90.1 seconds looking at Leigh. During this period Leigh did not smile at all. However, when the interaction is taken as a whole, Leigh spent 24.6% of the time looking at her mother. Leigh cried for 26% of the interaction taken as a whole.

Evidence for selectiveness during the interaction. In the first 100 seconds of Leigh's interaction with her mother she spent only 20.33% of the time in a hunched

posture (e.g. looking at her hand; Photo. 74); the rest of the time she was very active visually, making 86 fixations of stimuli other than her mother during this period (i.e. 51.6 per minute, 40 times more than Angela in Example (i)). All but one of Leigh's fixations of her mother were under one second long ($\bar{x} = .7$ seconds long), whereas Leigh's other fixations were, on average, longer than one second ($\bar{x} = 1.1$ seconds). This is in contrast to the second portion of the interaction, when Leigh's looks at her mother averaged 2.1 seconds in length as opposed to her other fixations, which averaged 1.5 seconds in length. In other words, if length of fixation can be taken as a measure of interest, Leigh appeared to be positively disinterested in her mother relative to other things for the initial 100 seconds of the interaction. Of course, it might be argued that this was not surprising as Leigh had only just entered the room in which she was sitting, whereas she had been with her mother more or less non-stop throughout the day - making her mother relatively uninteresting to look at. But this suggestion seems unlikely to be true in view of the facts that Leigh looked at the offered stimuli for a considerably greater proportion of the first 100 seconds of all her other visits to the laboratory (i.e. never less than 24.9% and, on average, 61.2% when starting with her mother) and that Leigh's level of interest in things other than her mother appeared to increase rather than decrease after the initial 100 seconds of the interaction, as measured by average length of fixation (i.e. \bar{x} increased from 1.1 seconds to 1.5 seconds).

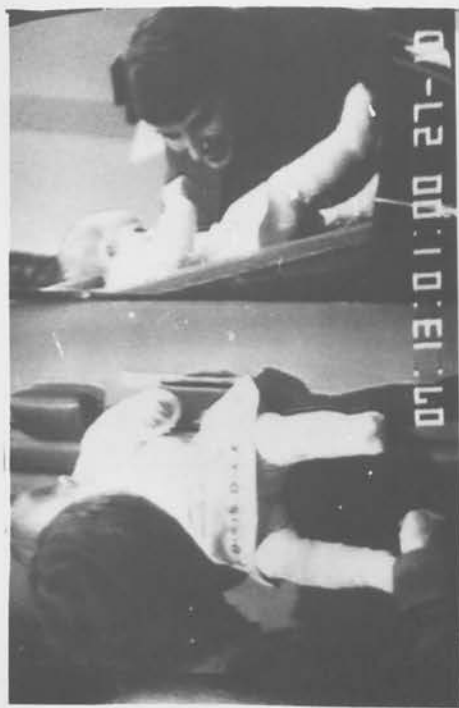
During this early period, Leigh disregarded her mother's attempts to enforce eye-contact by bringing her face very close to Leigh's (Photo. 75). It might therefore appear surprising that Leigh began to look

PHOTOS. 74-77 : Various expressions of negativity by Leigh and her mother's reactions to those expressions (Example 3ii).

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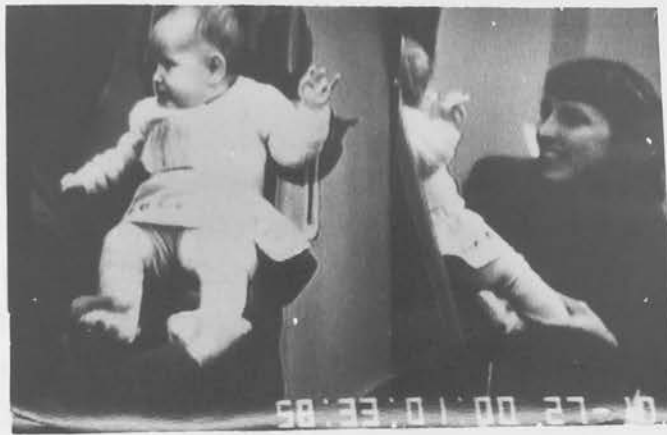
77



much more at her mother during the latter part of their interaction (i.e. 36.4% vs. 8.1%). But this increased looking was almost exclusively associated with the playing of games - as was all Leigh's smiling.

A 'fractional glance' came towards the end of the initial 100 seconds. Up to this point, Leigh had adopted without exception a 'blank' facial expression while looking at her mother and around the room but with some suggestion of lowered lip-corners ('sadness'; see Appendix I, Photo. 76). However, after 85 seconds she began to arch her back and vocalise negatively with an 'angry' cry-face (Photo. 77). There were two bursts of this behaviour within ten seconds, for the second of which Leigh looked at her mother (for 1.23, i.e. the longest look during the first 100 seconds). Then after 94 seconds, she simultaneously looked away from her mother at the right wall and stopped crying. The mother, who had been saying "Tell me stories." (Leigh begins crying) "Eh-eh! Eh-eh! Eh!", turned to follow Leigh's gaze, saying "What's that?". Almost immediately, Leigh turned back from the wall to look at her mother (Photo. 79). As soon as her mother began to look back at Leigh, Leigh turned away to the wall again (Photos. 78 - 80). This 'fractional glance' may have been caused by Leigh's surprise at seeing her mother's head move or by a wish to take advantage of an opportunity to look at the mother while the mother was looking away. But, in its context, both interpretations support the idea that Leigh was not eager to make sustained eye-to-eye contact with her mother during the initial period of this interaction. This is most clearly borne out by the fact that seeing her mother's head turn back towards her did not lead to prolonged attention, but to immediate turning away by Leigh.

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PHOTOS. 78-80 : A 'fractional glance' by Leigh (Example 3ii).

Contrast with other conditions. The most interesting contrast during this recording session was during her interaction with her mother; between her behaviour before and after the first 100 seconds. Thus her behaviour in the other three conditions was, in many respects, less positive than with her mother. This was particularly true when comparisons were made with the portion of the mother-infant interaction after the initial 100 seconds.

Synopsis:

Order and lengths of conditions: M (272 seconds), FM (278 seconds), S (331 seconds), UM (91 seconds).

Proportions of visual attention: M (25%), FM (49.6%), S (21.1%), UM (37.3%).

Proportions of smiling: M (14%), FM (0%), S (1.8%), UM (0%).

Proportions of crying: M (9.5%), FM (0%), S (0.6%), UM (63%).

Conclusion. The most important finding represented by this analysis is the difference between Leigh's negativity and Angela's, as described in the previous example. Leigh made no protesting vocalisations and was very active visually, whereas Angela was obdurately passive. Yet both interactions gave the impression that the infants were acting negatively with respect to their mothers.

The main question raised by this example is why Leigh behaved negatively towards her mother during the first 100 seconds with her mother but then began behaving much more positively. As mentioned above, this transformation was associated with the playing of games. Example (iii) illustrates in greater detail the way that games may transform infant negativity into a positive mood (cf. Chapter 6, pp. 187-192).

(iii) Leigh (aged 18 weeks)

Evidence for negativity. This interaction included the greatest proportion of smiling recorded in any single condition throughout the case-study (27.9%). But this was associated with three fractional glances, with concealed 'under the eyebrows' looks (Photo. 82), with back-arching, with resistance of an attempt by the mother to force Leigh into a position in which Leigh would look at her face (Photo. 81) and with protesting 'frustrated' vocalisations.

Evidence for selectiveness during the interaction.

These two sets of behaviours were clearly segregated. Their segregation is well reflected in the different lengths of Leigh's looks at her mother. She looked at her mother twenty-two times: thirteen of these looks were less than one second long, six were between one and five seconds long and three were over thirteen seconds long. The four longest looks (i.e. 4.6, 13.9, 14.7 17.3 seconds) were all associated with the playing of games. They all began within two seconds of the mother starting a game, and they all finished only after the mother had finished playing the game and resumed normal conversation. In each case, their onset was followed by smiling within between one and six seconds, whereas only one of the shorter looks was associated with smiling (this was a fractional glance, 0.4 seconds long, made three seconds after the mother had interrupted a game to clean up Leigh's mouth. The smile ended 0.1 seconds after the beginning of the look (Photos. 83-85). In fact, there were only four instances of smiling - coinciding with the four longest looks.

The mother only initiated a game on four separate occasions during this interaction - and each of these coincided with a long look and smile from Leigh. In each case the game consisted of a repeated sequence of

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PHOTO. 81 : Mother's attempt to coerce Leigh to interact with her.

PHOTO. 82 : An 'under the eyebrows' look by Leigh (Example 3iii).

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PHOTOS. 83-85 : A 'fractional glance' by Leigh (Example 3iii).

of actions and nonsensical noises, beginning with the mother making a gargling noise, with five or six narrowly separated stresses. Having made this noise one or two times, she would repeat it with more dramatic gestures - shaking her head from side to side and bringing her face close up to Leigh's. Finally she began to sway right away from Leigh at the start of each bout, throwing her head back to look up at the ceiling and breaking eye-contact. At the end of each bout, marked by one noise-action cycle, she would pause in a normal conversational position and smile at Leigh (see Photos. 86-89; cf. Chapter 6, pp. 187-192).

Contrast with other conditions. Once again, the main contrast to be made in this recording session was that made during Leigh's interaction with her mother. In most respects this interaction was the most positive of the four recorded during the session.

Synopsis:

Order and lengths of conditions: M (149 seconds), FM (277 seconds), UM (183 seconds), S (218 seconds).

Proportions of visual attention: M (46.4%), FM (41.1%), UM (12.8%), S (62.5%).

Proportions of smiling: M (27.9%), FM (0%), UM (0%), S (12.6%).

Conclusion. This analysis makes it clear that negativity is not simply associated with 'the mother', but with a particular form of interaction with her. As soon as games were substituted for conversation, Leigh became happy to interact with her mother - and as soon as games ceased, she became disgruntled. The final example develops a corollary of this point; namely, that the mother need not be the main target for negativity.

PHOTOS. 86-89 : One bout of a person-person game played by Leigh and her mother (Example 3iii).

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(iv) Joanna (aged 16 weeks)

Evidence for negativity. In this interaction a stranger received much less visual attention than did the mother, who preceded her (i.e. M (69.2%), S (17.8%), UM (47.3%), FM (39.5%)). She did not smile at the stranger at all and for the most part of their 'interaction', adopted a sulky, impassive facial expression with a slight pout, down-turned lip-corners and looking somewhat below the stranger's face (Photo. 90).

Evidence for selectiveness during the interaction. Joanna's attention appeared to be attracted by the pattern on the stranger's dress. But as soon as the stranger transferred her attention to the dress, Joanna made a fractional glance (Photos. 90-92).

Contrast with other conditions. The transition from mother to stranger, at the start of the stranger-interaction, was marked by a drop in smiling as well as looking. Joanna had smiled for 18.4% of the interaction with her mother. Interestingly, only 1.6% of her smiling was associated with the playing of games (5.2% of her looking). She therefore looked happily at her mother during simple 'conversational' babytalk - unlike Leigh and Angela in the previous examples. The stranger-interaction was the only condition during which Joanna did not smile.

During interaction with her mother, looks at the mother averaged 7.1 seconds in length as against 2.1 seconds with the unfamiliar person (6.1 seconds with the unfamiliar face-mask), while looks at objects other than the mother averaged only 1.6 seconds with the mother as against 2.9 seconds with the stranger (and 1.5 seconds with the unfamiliar face-mask). This suggests that Joanna was more interested in her mother and the unfamiliar face-mask than the surroundings,

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PHOTOS. 90-92 : A 'fractional glance' by Joanna (Example 3iv).

whereas, during the intervening condition with the stranger, this balance was reversed.

Synopsis:

Order and lengths of conditions: M (327 seconds), S (334 seconds), UM (287 seconds), FM (351 seconds).
Proportions of visual attention: M (69.2%), S (17.8%), UM (47.3%), FM (39.5%).

Proportions of smiling: M (18.4%), S (0%), UM (0.9%), FM (0.3%).

Proportions of crying: M (0%), S (0%), UM (0%), FM (4.2%).

Conclusion. This example underlines the fact that it is not just mothers who get rejected. It also shows that it is not just strangers who receive a relatively large amount of attention during normal 'conversational' interactions (cf. Example (i)) - mothers may also be treated in this way.

4. Discussion

These examples illustrate that the behavioural constitution of negativity is not uniform although its elements are drawn from a delimited class of behaviours. They also bear out the conclusion that negativity is related to the quality of stimulation to which infants are exposed. Thus, in all four examples, it appeared that infants were only rejecting one aspect of their situation, because, when this aspect changed, negativity ceased. This is compatible with the conclusion that negativity is the result of the frustration of infants' wills. Nevertheless, what infants will seems to be very variable. Thus sometimes they are content simply to be talked to by mothers and at other times they only want to play games. Sometimes they are happier with their mothers and sometimes they appear to want to talk to strangers. Sometimes they

prefer looking at people and sometimes they prefer masks. Thus, while in form infant negativity appears to be purposive - particularly in infants' active resistance to their mothers' physical coercion - it is difficult to detect the structure of their purposes. This difficulty is partly a product of the small and miscellaneous sample of examples considered so far. Therefore, before drawing any conclusions, we will go on to consider some further examples.

5. Further Examples

a. As reported on pages 224 - 232, maternal babytalk was used to locate potential examples of negativity in the data collected during the study reported in Chapter 6. Sixteen such instances were submitted to detailed analysis.

It was found that three sorts of relationship could be distinguished between negativity and explicit maternal comments referring to negativity:

(i) Comments which occurred during interactions which were uniformly negative in terms of the infant's behaviour. In these cases there appeared to be no proximate cause for the comments in question; they came out merely in the course of discussing the continued negativity of the baby.

(ii) These comments came in more positive interactions, all of which included some smiling and a relatively high level of positive regard (over 80% in some cases). These comments always had a proximate cause; namely, that the baby's behaviour in the preceding seconds had suggested a declining interest in the mother.

(iii) Unlike the previous types of comment, there were a few occasions on which explicit accusations of

negativity were not justified by subsequent analysis of the infant's behaviour - occurring during a period of positive interaction by the baby.

The analyses relevant to the concerns of this chapter are those of the first and second types. As will be seen, these analyses incorporate descriptions of relevant portions of the mother's babytalk. Analyses of type (iii) will be discussed in the next chapter, which concerns the developmental significance of babytalk.

b. Examples of comments made during continued negativity

(i) Joanna (aged 6 weeks)

Evidence for negativity. This interaction was peculiar in having the lowest amount of attention bestowed by any baby on any mother throughout the thesis-study. None of Joanna's five brief smiles coincided with looks at the mother. Towards the end of the interaction, Joanna began to cry.

Not surprisingly, a large proportion of the comments made by Joanna's mother suggested that her daughter was not communicating with her or communicating only negatively (36.2%: the highest proportion recorded during the thesis-study; see Tables 1-6). The two category 1 comments ("You're not interested in your Mummy's voice at all", "You're not interested at all") were made 153 and 213 seconds after the beginning of the interaction.

Evidence for selectiveness during the interaction.

Joanna only looked at her mother twice, both times after her mother had manhandled her head into a 'looking' position. Within three and a half seconds of each manhandling operation, Joanna again looked away from

her mother. For the remainder of the interaction, Joanna looked to the left of her mother's face, up at the ceiling-lights, at the wall, or at the camera. She also occasionally scanned the floor - though never adopting a hunched posture. Fixations of objects other than the mother were, on average, twice as long as fixations of the mother ($\bar{x}(M) = 2.7$ seconds; $\bar{x}(O) = 5.7$ seconds).

Contrast with other conditions. In the next condition, with a stranger (S), Joanna became increasingly distressed. During the first 159 seconds of this interaction she looked at her partner only 5.3% of the time, cried for 11.5% of the time and was sick. She was then removed from the baby-chair and comforted. On her return she looked at the stranger for 27.5% of the remaining 123 seconds and cried for 19.2% of that time. She became increasingly drowsy and in the third condition (with the familiar face-mask (FM)) she neither looked at the stimulus nor cried and, finally, after 84 seconds, fell asleep.

Synopsis:

Order and lengths of conditions: M (274 seconds), S (283 seconds), FM (84 seconds).

Proportions of visual attention: M (2%), S (15%), FM (0%).

Proportions of smiling: M (3%), S (0%), FM (0%).

Proportions of crying: M (1%), S (15%), FM (0%).

Conclusion. Joanna's lack of interest in interaction with her mother appears to have been the product of a greater interest in objects in her surroundings - as evinced by her smiling at and relatively long fixations of these objects. Towards the end of the M condition, the effects of disinterest were probably compounded by the effects of intestinal pain - as evinced by Joanna's subsequent sickness.

(ii) Joanna (aged 12 weeks)

Evidence for negativity. This interaction began happily, with Joanna smiling for more than half of the first 30 seconds. But it was interrupted after 67 seconds because Joanna was crying in a manner suggesting that she had wind. She was taken out of the baby-chair and patted on the back until she burped and then replaced in the chair. As it turned out, she cried more after this break than before it (. seconds vs. seconds), smiled less (7.0 seconds vs. 16.5 seconds) and, proportionately, looked less (31.5% vs. 73.0%).

While being frequent, Joanna's crying was not continuous after the break. It came in bursts, in between which she would appear content. These bursts averaged 3.4 seconds in duration (s.d. = 3.1 seconds) and were separated by pauses with an average length of 8 seconds (s.d. 13 seconds). Joanna did not cry for more than 11 seconds at any one time.

In the mother's babytalk, four explanations for Joanna's behaviour were put forward after the break. The first was that Joanna was suffering from intestinal pain:

"What is it? And is your tummy all bad? Oh dear! Oh dear!"

But, as Joanna's crying continued, this comment was followed by an expression of the view:

"There's nothing much wrong with you. There isn't. There is not. There is not. There is not. Now! Now! Now-now! You're just crying for the sake of crying aren't you."

This led on to the explanation that Joanna was 'being

bad':

"You're not gonna be good? You're not gonna be good? Hello. What is it? What's wrong with you? You're being bad, aren't you. Aren't you? Aren't you? You are."

Finally she proposed the explanation:

"What is it? You're not interested in your Mummy [Cat.1 comment]. Are you not interested in your Mummy? Are you not? Are you not interested in your Mummy? No?", etc.

Evidence for selectiveness during the interaction. In the forty seconds prior to the Category 1 utterance quoted above, Joanna made thirty-seven visual fixations of objects other than her mother and nine of her mother - of which one was a fractional glance. While the average length of her looks at objects other than her mother was greater than fixations of her mother ($\bar{x}(M) = .63$; $\bar{x}(O) = .92$), their brevity suggests that she was not taking a real interest in anything she looked at. Further analysis of the interaction supported this view - suggesting that Joanna's behaviour was less the product of selectiveness than of ambivalence; that is, "the co-existence of contradictory impulses towards the same object" (Rycroft 1972). Thus there was a dramatic 96-second sequence of brief looks ($n = 16$; $\bar{x} = .7$ seconds; $s.d. = .2$) interspersed with brief cries ($n = 7$; $\bar{x} = 1.9$ seconds; $s.d. = .9$) in which it appeared that Joanna was alternately attracted by and upset by interaction with her mother. This sequence was followed by a sequence in which slightly longer cries were interspersed with smiles at the mother. At one point the transition from cry to smile was so immediate that the mother commented: "You don't

know whether to laugh or cry, do you?".

Contrast with other conditions. Joanna had not cried at all in the conditions recorded before the interaction with her mother (UM and S), had looked more and, with S, smiled more. She looked more in the final condition (FM) than with her mother but continued to cry in similar short bursts for a similar proportion of the interaction ($M(\text{post-break}) = 31.1\%$, $FM = 31.2\%$; $FM \bar{x}(\text{cry}) = 2.5$ seconds, $s.d.(\text{cry}) = 2.2$ seconds, $\bar{x}(\text{pause}) = 5.5$ seconds, $s.d.(\text{pause}) = 5.1$ seconds).

Synopsis:

Order and lengths of conditions: UM (292 seconds), S (305 seconds), M (276 seconds), FM (263 seconds).

Proportions of visual attention: UM (79%), S (71%), M (42%), FM (77%).

Proportions of smiling: UM (0.3%), S (15%), M (8%), FM (0%).

Proportions of crying: UM (0%), S (0%), M (25%), FM (31%).

Conclusion. It seems that the negative behaviour in this example was not all directed at the mother - thus crying continued at almost exactly the same rate in the following condition with the familiar face-mask. In this case, one might argue that Joanna's negativity was either due to internal discomfort or frustration with sitting in the baby-chair. However, this argument makes it difficult to explain why Joanna looked nearly twice as much in the final condition as she did with her mother. The fine detail of her behaviour with her mother suggests that it manifested ambivalence.

(There was no evidence of ambivalence in the final condition, i.e. no cry/smile transitions and much longer looks: $\bar{x}(M) = 2.8$ seconds, $s.d. = 3.9$ seconds; $\bar{x}(FM) = 5.8$ seconds, $s.d. = 7.8$ seconds.)

Conclusion. As all the crying with the stranger came

(iii) Joanna (aged 21 weeks)

Evidence for negativity. Joanna cried for all but eighteen seconds of this ninety-two second interaction. She only looked at her mother for 21% of the time they were together and sat for the most part in a hunched position.

By the end of the interaction, the mother had concluded that Joanna's crying was the manifestation of 'temper':

"Eh? You're not even gonna look at me? You're just not talking to me. Now listen, that's temper. That's just sheer temper! That's temper you!"

Evidence for selectiveness during the interaction.

The interaction included one attempt by the mother to make Joanna 'more comfortable' by forcing her to sit back in a face-to-face position. Joanna resisted the attempt (Photos. 93 - 95). Joanna stopped crying almost as soon as she was removed from the baby-chair.

Contrast with other conditions. M was the final condition in this recording session. Joanna had started crying in the previous condition (with S). However, she looked and smiled much more in this condition than with M - as she did in the FM and UM conditions.

Synopsis:

Order and lengths of conditions: UM (267 seconds),

FM (222 seconds), S (220 seconds), M (92 seconds).

Proportions of visual attention: UM (62%), FM (57%), S (71%), M (21%).

Proportions of smiling: UM (2%), FM (3%), S (8%), M (1%).

Proportions of crying: UM (0%), FM (0%), S (30%), M (80%).

Conclusion. As all the crying with the stranger came

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PHOTOS. 93-95 : Joanna resists an attempt by her mother to coerce her attention (Example 5biv).

at the end of the condition and as it continued to increase in the final condition with the mother, Joanna's negativity might be interpreted as the product of growing frustration with being strapped into the baby-chair. If this were the case, the mother's interpretation of Joanna as expressing 'temper' would be correct insofar as Joanna was annoyed with her mother for not immediately removing her from the baby-chair. The fact that Joanna calmed down as soon as she was removed from the chair gives support to this interpretation.

(iv) Sarah (aged 13 weeks)

Evidence for negativity. Sarah cried for 39% of this interaction - the highest percentage for any session involving Sarah - and only looked at her mother without crying for 33% of the time. She smiled once (1.1% of the interaction).

Her mother's first Category 1 comment ("You're not going to have a chat today") was made after Sarah had been crying non-stop for twelve seconds. This crying was associated with a pout, elements of an angry face and back-arching (see Photos. 96 and 97; Appendix 1). Her crying was generally discontinuous and gave the impression that Sarah was frustrated.

Evidence for selectiveness during the interaction.

None: Sarah's frustration seemed to increase steadily until her mother's place was taken by a stranger.

Contrast with other conditions. The most convincing evidence that Sarah was not simply 'in a state' came from the complete change in her behaviour when confronted with an unfamiliar adult (Photos. 96 - 99).

During their subsequent interaction, Sarah did not cry at all and looked at her partner for 67% of the time they were together.

Sarah's interaction with the stranger was recorded

PHOTOS. 96-99 : Transformation in Sarah's expressions before and after she stopped interacting with her mother and started interacting with a stranger (Example 5biv).

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in between two interactions with her mother. Not surprisingly, when the mother came into the room to begin her second interaction with Sarah - having been observing her behaviour with the stranger from another room - she commented:

"It's just me you don't want to talk to, isn't it?"

As can be seen from her babytalk during this second interaction (Appendix 5i), Sarah continued to ignore and cry at her mother, as she had in the first interaction. The mother comments on both Sarah's negativity and her selectiveness:

"I'm not the person you grump to ... Do I only get the grizzle side? ... You're not going to chat to me today ... You're giving me the cold shoulder ... You're giving me the cold shoulder."

Unfortunately, the visual record of this second interaction was on video-tape, which, for reasons of departmental finance, had to be used for other recordings before the analysis for this chapter could be undertaken. A detailed analysis of it cannot be given therefore.

Conclusion. The cessation of Sarah's crying with the stranger and its renewal on her mother's return - reflected in the mother's babytalk (see Appendix 5i) - suggests that it was directed specifically at her and was not simply a product of frustration with the recording conditions.

c. Examples of comments which were made on the occasion of particular instances of negativity rather than during protracted spells of negativity.

(i) Joanna (aged 15 weeks)

Evidence for negativity. This recording session included two interactions with the mother. Two Category 1 comments were made during the second mother-infant interaction.

Joanna cried considerably less during this interaction than she had in the previous two conditions, and smiled more. However, she spent less than 13% of the interaction looking at her mother.

Evidence for selectiveness during the interaction.

The two Category 1 comments were made after Joanna had turned away from her mother, beginning to cry, but then focussed on an unfamiliar adult standing by the door of the recording studio, and immediately stopped crying (Photos. 100-103):

"Are you going to talk to me? Are you? Are you going to talk to me? (Joanna begins to turn away) You're going to start crying again aren't you. (Joanna begins to cry) Yes. Yes. (Joanna sees the stranger and stops crying) See - there's someone to look at! Hello. (Joanna smiles at the stranger) Oh, you're fed up with your Mummy aren't you! You're just fed up with your Mummy now aren't you!"

During this interaction Joanna spent more than twice as much time looking at the stranger than at her mother (32.7% vs. 12.7%), her looks at the stranger were, on average, considerably longer than those at the mother ($\bar{x}(M) = 2.0$ seconds, s.d. = 1.4 seconds, $n = 18$; $\bar{x}(S) = 10.0$ seconds, s.d. = 13.7 seconds, $n = 9$), and she smiled for a higher proportion of the time she was looking at the stranger (3% (M) vs. 8% (S)). She

PHOTOS. 100-103 : Transformation in Joanna's expressions, whilst interacting with her mother, on seeing a stranger standing by the door of the recording-studio (Example 5ci).

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cried, proportionately, twice as much at her mother as at the stranger (22% (M) vs. 11% (S)).

Contrast with other conditions. Joanna cried a lot during this visit to the laboratory. But her mother and the experimenter agreed that her crying was not due to any physical suffering. This impression was reinforced by Joanna's behaviour in the third condition (UM: pirate). At two points, this condition was broken by the mother going into the recording studio to discover why Joanna was distressed (for 62 and 25 seconds respectively). On both occasions, Joanna stopped crying as soon as she saw her mother and, within three seconds, smiled at her (e.g. Photos. 103A-105). In the 30 seconds before the first break, Joanna cried for 94% of the time. In the first 30 seconds of the break she did not cry at all and smiled for 9 seconds, having not smiled at all with the face-mask. Indeed, she only cried once during this break (1.1%) - despite spending 6.8 seconds looking at the face-mask. This showed that the face-mask only elicited crying under certain circumstances.

Joanna spent 73.4% of this break looking at her mother. As soon as she saw that her mother had left the room she started crying again. She cried for 87% of the next 23 seconds - looking at the mask for 56.6% of the time. Then her mother returned - whereupon her behaviour was again transformed (32% smiling, 73% looking at mother, 0% crying). Her mother's second exit was followed by renewed crying (Photos. 106-109).

The next condition (FM) contained almost continuous crying and was interrupted after 69 seconds by the mother's attempt to comfort Joanna. It was this attempt which led to the second mother-infant interaction described above.

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PHOTOS. 103A-105 : Transformation in Joanna's expressions, whilst in the presence of an unfamiliar face-mask, on seeing her mother standing by the door of the recording-studio (Example 5ci).

PHOTOS. 106-109 : Transformation in Joanna's expression, whilst in the presence of an unfamiliar

face-mask, on seeing her mother disappear from the door of the recording—studio (Example 5ci).

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Synopsis:

Order and lengths of conditions: M (323 seconds), S (341 seconds), UM (206 seconds), FM (69 seconds), M (277 seconds).

Proportions of visual attention: M (68%), S (50%), UM (66%), FM (78%), M (13%).

Proportions of smiling: M (6%), S (1%), UM (0%), FM (0%), M (3%).

Proportions of crying: M (0%), S (12%), UM (54%), FM (87%), M (22%).

Conclusion. Taken in conjunction with her behaviour in the third condition (UM), Joanna's behaviour in the second mother-infant interaction suggested that she was crying because she wished to be taken out of the baby-chair. On both these occasions, her positive behaviour was directed at someone standing by the door and, usually, people didn't appear at the door unless they were going to attend to her needs. Thus, on both occasions, it appeared that she stopped crying and started smiling in anticipation of being picked up. This impression was supported by the frustrated sound of her cries - the fact that they were generally of low intensity and discontinuous. It was also supported by the observation that, on the two occasions when preparations were made to take her out of the chair during the final interaction (i.e. when the waist-band was undone) she stopped crying - only to restart when it was refastened. As the mother's babytalk shows, by the end of the second mother-infant interaction Joanna was looking from face to face, crying at stranger, mother and experimenter alike - as if she had 'given up hope' of anyone liberating her:

"(as Joanna cried at the experimenter) No, he's not going to help you. (as Joanna cried at the stranger) No, nobody's going to help you."

(ii) Joanna (aged 26 weeks)

Evidence for negativity. During this interaction Joanna smiled at her mother at least once every 50 seconds for a total of 5.5% of the time, but looked for only 15.6% of the time. While she did not cry, she did make frequent protesting vocalisations (i.e. vocalisations in conjunction with elements of an angry facial expression; Photo. 110, Appendix I). For 41% of the time, she adopted a fixed hunched posture (Photo. 111).
Evidence for selectiveness during the interaction.

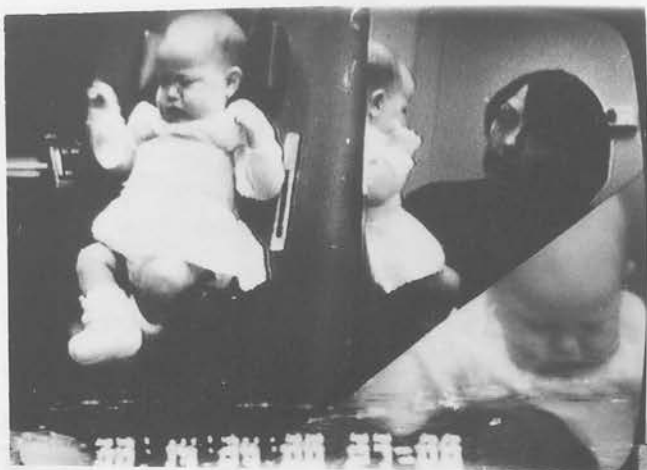
Joanna's mother made four Category 1 comments during this interaction. The first came after a period of 13 seconds during which Joanna did not look at her mother, but made ten fixations on either side of her - so that she twice swept her gaze 'across' her mother. Her mother's babytalk ran:

"Yes, you're too busy looking round aren't you. You're not - you're just not interested in what I'm saying."

The second Category 1 comment came after a period during which the mother had captured Joanna's attention by holding up her hand in Joanna's line of vision and waving her fingers. Joanna was fascinated by this, looking at the fingers 100% of the time and making no vocal protests (Photo. 112). Immediately after this episode, Joanna looked at her mother briefly (1.7 seconds) and smiled. She then re-adopted her hunched posture. Babytalk:

"(mother begins moving fingers) You got to catch it. Come on. Come on. Come on. Come on then. (mother stops moving fingers) (Joanna looks at her smiling) What do you say? What were you saying? (Joanna hunches and stops smiling) What were you saying then, eh? You're not telling me any stories - you just prefer talking to your masks."

110



111



112



PHOTOS. 110-112 : Joanna's expressions of negativity, contrasted
with her interest in her mother's fingers (Example 5cii).

The mother successfully entertained Joanna with finger-movements on five separate occasions (i.e. all with 100% visual attention from Joanna and with only two vocal protests: 4% of the protest in 12% of the time). The third Category 1 comment came 17 seconds after the second finger-moving episode. Immediately after the mother lowered her fingers - at which Joanna had been looking and smiling - Joanna lowered her gaze from the mother and stopped smiling. After two seconds, the mother attempted to get Joanna to look at her face by lowering it into Joanna's line of vision, but Joanna avoided visual contact by lowering her own gaze (Photos. 112A-114). In the next 12 seconds, Joanna made five protesting vocalisations. But her interest suddenly rekindled when the mother began to scratch the side of her (the mother's) nose (Photos. 115-117). In the next 2.6 seconds neither baby nor mother made a sound. Then the mother made the comment:

"(Joanna protesting, looking down) What's the matter? What's the matter? (the mother begins to scratch her nose, Joanna looks up) You'd much rather play with something than I talk to you, wouldn't you."

The fourth Category 1 comment came after a series of protests by Joanna had been followed by Joanna looking well away from her mother (at the TV camera) and putting her thumb in her mouth - at which point her face relaxed from an angry grimace to impassivity (Photos. 118-119). Her mother's babytalk ran:

"(Joanna protesting) Come on! Oh dear! (Joanna puts her thumb in her mouth) Oh dear. Is that thumb awful good? You're not gonna talk to me any more then. Have you had enough of me? Eh?"

112A



113



114



PHOTOS. 112A-114 : Joanna's response to her mother's attempt to
make eye-contact (Example 5cii).

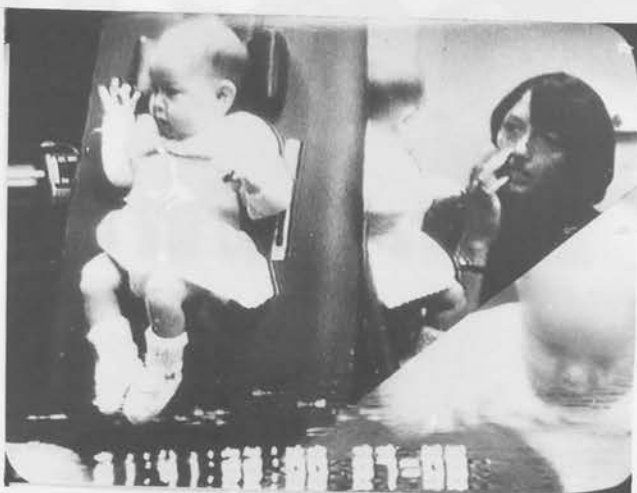
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116



117



PHOTOS. 115-117 : Joanna's response to her mother scratching the side of her(the mother's) nose (Example 5ci1).

118



119



PHOTOS. 118-119 : Joanna relaxes from the negativity associated with interacting with her mother to impassivity, associated with thumb-sucking (Example 5cii).

Contrast with other conditions. Joanna's looks at her mother were shorter on average than those at the three other stimuli ($\bar{x}(M) = 1.7$ seconds, $\bar{x}(S) = 2.5$ seconds, $\bar{x}(FM) = 6.4$ seconds, $\bar{x}(UM) = 2.3$ seconds). The greatest visual attention and smiling was in the first condition, with the familiar face-mask. Indeed, this condition contained more smiling than any other condition recorded with Joanna. Joanna made no vocal protests when with the face-masks and fewer when with the stranger than when with her mother (19 vs. 50). Also, the ratio of the lengths of her looks at things other than the stimulus-object was less favourable with the mother than in any other condition ($M = 1.6$, $S = 1.2$, $FM = 0.2$, $UM = 1.0$).

Synopsis:

Order and lengths of conditions: FM (293 seconds), UM (310 seconds), M (373 seconds), S (287 seconds).

Proportions of visual attention: FM (54%), UM (25%), M (16%), S (16%).

Proportions of smiling: FM (23%), UM (7%), M (6%), S (5%).

Proportions of crying: FM (0%), UM (0%), M (0%), S (1%).

Conclusion. There is ample evidence that the cause of negativity in this mother-infant interaction was Joanna's dislike of 'pure' conversation. Thus all four Category 1 utterances were made shortly after Joanna had behaved in a way suggesting preference for something other than adult-infant interaction per se. Similarly, in the final condition, the stranger 'entertained' Joanna very successfully by giving her a bunch of keys to play with. Joanna was fascinated by the keys, vocalising protestingly only four times during the time she had them (i.e. 21% of the protests in 61% of the time).

(iii) Sarah (aged 18 weeks)

Evidence for negativity. This interaction included some smiling (9%), 35% looking at mother and 5% crying.

Evidence for selectiveness during the interaction.

This interaction incorporated five 'rejected' comments by the mother. The first came 12.4 seconds after the beginning of the interaction. As the mother came into the recording chamber, Sarah greeted her with a look lasting 3.5 seconds. She then turned away from her mother and began to scan the rest of her environment, making four fixations and scanning once across her mother, finally adopting a 'hunched' position (Photos. 120 - 124). This behaviour was accompanied by the mother saying:

"Hello darling. Are you gonna chew you little dress? Are you gonna chew your little dress? (Sarah looks away) Are you? Hello darling. Hello. Sarah. Sarah. Hello Sarah. Are you gonna look round the room? (Sarah hunches) You're not gonna look at me."

Sarah continued to avoid her mother's attempts to attract her attention by blowing a raspberry and bringing her face close up to Sarah's (Photo. 125).

The next three 'rejected' comments came in a 15-second period, 24 seconds after the first comment. The first came after a spell lasting 6.7 seconds, during which the mother had entertained Sarah by playing with a minute toy panda. After this Sarah looked at the mother for 2.7 seconds, smiling briefly. Then, looking away and back twice in the next two seconds, she finally looked away again for a longer period. Three seconds after this more decisive turn-away, the mother, having clicked her tongue as if to attract Sarah's attention, made her comment:

PHOTOS. 120-123 : Sarah sweeps her gaze 'across' her mother (Example 5ciiii).

120



121



122



123



124



125



126



PHOTOS. 124-126 : Sarah hunches and ignores her mother's attempts to amuse her (Example 5ciii).

"You're a little dancing bear. You're a little dancing - ... (Sarah looks away twice) (mother clicks tongue) (Sarah does not react) You're not gonna talk to Mummy."

Two seconds later, Sarah looked back at her mother for 3.2 seconds and smiled:

"Sarah. Hello. Hello. (Sarah looks back) Hello."

But then Sarah looked away again. A third of a second later the mother made a second comment:

"Hello. (Sarah looks away) You're not gonna talk to Mummy."

This period of disregard lasted ten seconds; four seconds after its start, Sarah adopted a hunched posture. Once again the mother tried clicking her tongue to attract Sarah's attention but, failing, she made a third comment ("You're not gonna talk to Mummy"). Shortly after this, Sarah looked back at her mother for eight seconds and smiled.

The fifth and final Category 1 comment came 37 seconds after the fourth. It was preceded by a long period - 27 seconds - during which Sarah sat hunched, looking at the floor which, in turn, was preceded by a fractional glance. This long period of disregard was followed by a brief (0.5 seconds) look at the mother, a further 4.3 seconds hunched but looking at the toy panda, a final look (2 seconds) at her mother and then a further long period (22 seconds) of inattention to her mother's face. It was one and a half seconds after the beginning of this long, resumed 'hunch' that the mother made her comment:

"Hello. Hello Sarah. Hello. (27 second period of 'hunching' ends) You don't know what you're gonna do today do you? No. No. (22 second period of hunching begins) Poppet. You're not gonna look at Mummy."

Sarah continued to disregard her mother, despite the latter's attempt to attract her attention with the toy panda (Photo. 126) and by clicking her tongue.

Contrast with other conditions. While Sarah spent only 35% of the interaction with her mother looking at her mother's face, she spent 68% of the following condition looking at an unfamiliar adult's face.

Conclusion. It seems that, in the light of Sarah's smiles at her mother and low level of complaint, she did not feel frustrated with her mother per se. Similarly, Sarah's subsequent behaviour with a stranger suggests that the negativity during this mother-infant interaction was not due to a dislike of interaction per se. We must therefore conclude that her negativity was a product of specific dislike of 'conversational' interaction with her mother.

(iv) Sarah (aged 20 weeks)

Although the one 'rejected' comment made during this interaction is off the remaining record (i.e. "You're going to look at anything else other than me"), the three and a half minutes of interaction which do remain (106 seconds with the mother; 83 seconds with an unfamiliar adult) give a good idea of the quality of the interaction - including a very striking change in Sarah's behaviour with her mother to that with the stranger.

Contrast between conditions. Sarah spent only 22% of the (recorded) interaction with her mother looking at her without crying (as opposed to 96% with the stranger). She smiled only twice ($\bar{x} = 1.41$ seconds)

for 2.7% of the interaction, whereas she smiled eleven times at the stranger ($\bar{x} = 3.25$ seconds; total = 33.73% of the interaction) - in an interaction immediately following that with her mother. With her mother she made twenty-three protesting cries. But as soon as the stranger came in and started interacting with her, she made no more cries.

Comment. Interestingly, the success of the interaction with the stranger was connected with the stranger's insistence on playing an imitation-game with Sarah - attempting to get Sarah to imitate repeated tongue protrusions. Much of Sarah's looking and smiling was at the antics of the stranger's mouth. Similarly, the two times that Sarah smiled at her mother coincided with her mother playing a tongue-clicking game with her (cf. Leigh, pp. 242-252).

6. Discussion and Conclusions

While the foregoing analyses are far from exhaustive, they do enable us to address a number of the points that were made about infant negativity in our survey of the literature.

In the first place, we can reject Spitz's explicit assumption that negativity does not occur in the first six months of life under normal circumstances. We can also reject Spitz's equation of negativity with a simple behavioural pattern akin to rooting (i.e. lateral gaze-aversion). It occurs earlier and in a much more complex fashion than he supposes.

A second point is that, in all the examples reviewed above, negativity appeared to be specific to particular circumstances. In other words, negativity does appear to be related to the quality of stimulation to which infants are exposed. This finding runs counter to the arguments put forward by Klein, Brazelton et.al.,

Stechler and Carpenter and Stern. On the other hand, the lability of the infants' reactions to very similar circumstances - sometimes accepting games and sometimes rejecting them, being interested in finger-movement but not tongue-clicking or vice versa - suggests that negativity has a significant 'internal component'. But, in the light of this lability, the internal component of negativity should not be conceived in terms of stable physiological processes such as 'instincts' or 'basic regulatory mechanisms'. It seems better to conclude in psychological terms - that infants have varying interests or desires.

Murray's findings suggest that negativity is primarily a product of the frustration of infants' interest in face-to-face interaction, and constitutes a 'solicitation for responsiveness'. In this case, negativity would be primarily a social phenomenon (i.e. caused, and therefore relieved, by social circumstances). The findings reported here show that this is not always the case. Negativity may be caused by both social and asocial circumstances: frustration with the purely conversational interaction (e.g. Example 3(i)) or frustration with being strapped into the baby-chair (e.g. Example 5c(i)). Similarly, it may be expressed in the presence of other people or in their absence (e.g. Example 5c(i)).

The fact that negativity can be caused by both social and asocial circumstances suggests that it should not be viewed simply as a protest to others. Given the sensitivity of human beings to their fellows, negativity will often constitute a protest to others. But one sometimes observes circumstances by which an infant is frustrated but which are subsequently changed by non-social means to facilitate the fulfilment of the infant's desire. For example, infants sometimes

protest when the sun is in their eyes, but they are relieved just as effectively by a cloud which obscures the sun as by a person who moves their pram. In this sense their negativity should not be seen so much as a social protest, but more as a 'protest against the universe'. Negativity is only seen as social by adults because it is comprehensible to adults.

We may conclude, as we concluded our survey of the literature at the start of this chapter, that negativity is caused by the frustration of the infant's purposes by external conditions. The principal remaining question concerns the nature and development of infants' purposes.

We have already remarked that infants' purposes appear to be very varied. However, if all the twelve analyses discussed in this chapter are considered, we may note that negativity was only observed after ten weeks of age or before seven weeks of age, an observation which accords with Trevarthen's (1979c) descriptions of early development and with the concluding suggestions in Chapter 6. In other words, it seems likely that the general decline in infant attention to all experimental stimuli during the 10-28 week period reported in that chapter was a product of a general increase in the infants' ability to investigate and act on their surroundings. This would incorporate a decline of interest in purely conversational social interaction - in which infants play a relatively passive role - and an increase of interest in games where their role can be more self-determined (active). Negativity is a product of this development because, in the elaboration of more varied and more complex purposes, infants will become increasingly aware of frustrations caused by external circumstances. Put another way, negativity can be seen as the product of ignorance - of an inability to derive satisfaction from present circumstances. Whether it is developmentally beneficial or detrimental

depends on whether or not it leads to new understanding.

Perhaps this is what John Keats (1970) meant when he said that it is the quality of negative capability:

"that is when man is capable of being in uncertainties, mysteries, doubts, without any irritable reaching after fact and reason"

which goes to form a 'man of achievement'. Negativity is a two-edged sword: it simultaneously bears testimony to the fact that the natural tendency of human beings is to increase their power of self-determination and to the fact that this tendency can be overcome by external forces. The essence of negative capability - and thus one of the secrets of development - would be to have confidence in one's nature whilst acknowledging that one is (temporarily) in adversity.

1. Bayley's Analysis

The hypothesis that the infant's behaviour is determined during the first six months of life is a hypothesis which is based on the analysis of the relationship between the infant's behaviour and the infant's physical and mental development. As reported in the literature, the infant's behaviour is determined during the first six months of life.

Chapter 8: SOCIAL INFLUENCE IN THE EARLY MONTHS: ITS NATURE AND DEVELOPMENTAL SIGNIFICANCE

In previous chapters we have discussed both the positive tendencies of young infants - to relate to other persons and to explore their surroundings - and ways in which these tendencies may be frustrated. As it stands, our discussion might appear to stress constitutional factors in development whilst ignoring the influence of society. In many respects this is a false impression. The tendency of infants to explore and learn about the world into which they are born, when combined with their social sensitivity, will naturally lead them to become more and more involved with the persons with whom they deal and, thus, with society. This is essentially a positive process, leading to the active acquisition of increasingly elaborate social skills, amongst which the use of language is pre-eminent. The process is two-way, however: the more children become involved in society and the more their knowledge becomes social knowledge, the more their behaviour is determined by society, the more their actions come under social influence. While it is recognised that infants are unlikely to be aware of social influence as social influence during the first six months of life, this chapter suggests that a complex form of social influence is operative during this period.

1. Babytalk Analysis

The hypothesis that society influences babies during the first six months of life is a conclusion drawn from the analysis of the relationship between maternal baby-talk and the infant behaviours to which it refers. As reported in the previous chapter, mothers made three types of explicit attributions of negativity to their daughters during interactions. Two of these types were justified. But sometimes mothers made comments attributing negativity to their daughters during positive interactions. It is this third type of comment which gives a hint as to the means by which society influences babies during the first six months of life. Four examples follow. Recording procedures, subjects and methods of analysis are the same as those described in Chapter 7.

Examples:

(i) Joanna (aged 10 weeks)

Evidence for negativity. This was an interaction in which Joanna looked at her mother for 81% of the time and smiled for 19.9% of the time. There was no crying. Thus the interaction was, generally, a positive one.

Evidence for selectiveness during the interaction.

After 186 seconds of the interaction, the mother made a Category 1 comment. It came at the end of the following sequence:

"Just going to sit there and be sick all day are you? Are you just going to sit there and be sick all day? Are you? What do you see round there? What do you see round there? Oh, you're having a wee look round now. You're having a wee look round - . You've got fed up with your Mummy."

This sequence began after a long spell of attention by Joanna to her mother (29 seconds) which culminated in Joanna being sick - something that her mother had been predicting:

"Look! You'll make yourself sick. (Joanna had been holding her left hand in her mouth) (Her mother removes it) You'll just make yourself sick. Aha. (in response to a little vocalisation by Joanna) See, there - you bring up that wee bit there (as Joanna brings up a little sick). There you go! Tt! - (intake of breath by mother) Come on then (as she begins vigorously to clean up Joanna's face and clothes). Just gonna sit there and be sick all day are you?", etc.

But as her mother began to wipe Joanna's face, Joanna broke gaze, (see Photos. -) She looked back for 2.6 seconds at the end of the wiping up operations, but finally broke gaze again to the right (for 9.5 seconds) - at which point the mother said twice "What do you see round there?". Joanna then swung her attention across her mother to the left-hand side of the room. Her mother's comment was "Oh, you're having a wee look round now". At this point, Joanna looked back at her mother. It was half a second after mutual gaze was re-established that Joanna's mother began to say "You're having a wee look round now - You've got fed up with your Mummy". One tenth of a second before the end of this second utterance, Joanna began to smile. She continued to look at her mother for an unbroken spell of 48.5 seconds - during which she smiled four times (total = 14.2 seconds) - the longest single spell of attention during the whole interaction. Two tenths of a second after Joanna began to smile at her, the mother also began to smile. Her babytalk continued "No? You're not fed up with your Mummy yet".

Contrast with other conditions. This interaction formed the first condition of the session. In subsequent conditions she looked at the stranger for 98.5% of the time - the highest proportion of attention recorded during any condition throughout the thesis-study - but smiled less than with her mother (i.e. 19.9% vs. 3.1%). She also looked a lot at the face-masks, but, with them, did not smile at all.

Synopsis:

Order and lengths of conditions: M (290 seconds), S (339 seconds), UM (147 seconds), FM (269 seconds).
Proportions of visual attention: M (81.5%), S (98.5%), UM (82.4%), FM (85.2%).

Proportions of smiling: M (19.9%), S (3.1%), UM (0%), FM (0%).

Proportions of crying: none during the recording session.

Conclusion. This example demonstrates clearly the hypothetical nature of mothers' babytalk. In this instance, the mother's hypothesis - that the baby was "fed up" with her - was disconfirmed by Joanna's subsequent smiling and attention, and the proposition was not repeated. Nevertheless, it is interesting that, for this mother, Joanna's "having a wee look round" leads on 'naturally' to the idea that Joanna is fed up with her. It might equally well have led on to the idea that the baby was planning an utterance, for example, or comparing the colour of the walls.

Indeed, four of the mothers in this study never made an utterance of the type "You've got fed up with your Mummy", even though their babies looked away from them as often, and in some cases much more often, than Joanna did. The evidence suggests that, in this interaction, the baby was particularly interested in and happy to look at her mother (e.g. average look at

mother = 15.8 seconds, average look at other things = 1.8 seconds).

One interesting possibility is that the mother's inappropriate attribution of negativity had something to do with her daughter's sickness during the interaction. As already noted (p. 194), Joanna was a colicky baby during her early months, and was frequently sick during recording sessions. There is some evidence that the mother saw this sickness as directed at her. For example Joanna was sick near the beginning of an interaction recorded at 18 weeks. Her mother's babytalk runs:

"... Are you going to tell me a story? Hey! Are you going to tell me a story? Come on. (Joanna is sick) Oh! (sounding piqued) Joanna! I'm sure you do that on purpose when I appear! (pause while the mother, looking disgusted, wipes up the sick) Come on then...", etc.

This is an interesting example of the well-documented Western tendency to see 'physical' illness as having 'psychological' status (Sontag 1979), which, coincidentally, conforms to the semantic ambiguity in the expression "fed up".

(ii) Joanna (aged 16 weeks)

Evidence for negativity. As a whole, this interaction was a positive one (looking 69.2%, smiling 18.4%).

There was no crying.

Evidence for selectiveness during the interaction.

Prior to the comment in question, Joanna had spent a continuous spell of 39.2 seconds looking at her mother, a period of which she smiled for 9.3 seconds. The comment was made 1.3 seconds after Joanna broke this spell of gaze. Joanna looked back after two more seconds and, of the next minute, she looked at her

mother for 55 seconds and smiled seven times for a total of 8.7 seconds - the first time only 8 seconds after she looked away. Thus the Category 1 comment was made during a brief lapse in what appears to be a very positive spell of interaction.

While it might seem that the mother's comment "You're not going to tell me anything" was elicited by the brief break in Joanna's gaze and smiling at her mother, subsequent comments suggest that it was a reference to Joanna's quietness. The mother appeared to equate 'talking' or 'telling her' with Joanna's vocalisations. Thus, even after Joanna turned back to her and started smiling, she continued to make such comments as "Are you not going to talk to me?" and "Not even going to say a thing to me?". Joanna's next vocalisation transforms the tone of her mother's babytalk:

"What is it? Have - . (Joanna vocalises) What? What? What are you telling me? Tell - . (Joanna vocalises again) Oh! Is it big things? Are you telling me big stories? Are you? Are you telling me awful big stories? Are you really? Tell me then!"

Contrast with other conditions. The other conditions in this recording session have already been discussed in the previous chapter (Example 3(ii)), because, in the condition immediately following Joanna's interaction with her mother, she manifested negativity towards an unfamiliar adult. Only a synopsis will be repeated here.

Synopsis:

Order and lengths of conditions: M (327 seconds), S (334 seconds), UM (287 seconds), FM (351 seconds).
Proportions of visual attention: M (69.2%), S (17.8%), UM (47.3%), FM (39.5%).

Proportions of smiling: M (18.4%), S (0%), UM (0.9%), FM (0.3%).

Proportions of crying: M (0%), S (0%), UM (0%), FM (4.2%).

Conclusion. By her own standards, the mother's Category 1 comment was not inappropriate in this interaction; it referred to Joanna's quietness. However, her restriction of the reference of the words 'talk' and 'tell' to vocal behaviour is an interesting one. Earlier in the study she had appeared perfectly happy to chat with Joanna by responding to gaze, happy facial expressions and gesticulations. This suggests a 'tightening up' of the mother's criteria of infant communication during this recording session.

(iii) Sarah (aged 8 weeks)

Evidence for negativity. This interaction included the highest proportion of visual attention recorded during the case study (94.3%) and a high proportion of smiling (18.2%). There was no crying.

Evidence for selectiveness during the interaction.

The mother made two Category 1 comments towards the end of this long (426 seconds) interaction. At the beginning of the interaction Sarah had been rather impassive, blinking a lot - possibly as a result of the photo-floods directed at her (N.B. these interactions were recorded on film as well as video-tape, unlike the later case studies - and film requires more light than video-tape). However, after four minutes, Sarah began to perk up. Her new mood culminated in a remarkable episode of interaction, involving minute 'imitations' by Sarah of her mother's mouth movements. This episode was initiated by Sarah flashing her eyebrows at her mother after eight seconds of close attention to the mother's face (an element of greeting;

see Photo. 127, Appendix 1). 0.8 seconds later, Sarah began to smile and 0.3 seconds after this the mother reciprocated the eyebrow flash. (Photo. 128).

Half a second later Sarah smiled again and then, after another half second, her mother smiled. 0.2 seconds later, Sarah began a short burst of prespeech (Photo. 129). Two-thirds of a second later, after Sarah had begun smiling again, the mother flashed her eyebrows a second time and said "Hhho yea!". A second later, Sarah began another burst of prespeech. One and a half seconds after this, the mother began to say, in what appeared to be an imitation of Sarah's prespeech movements, "Howowowowo!". Sarah, her attention still fixed on her mother's face, began to imitate her mother's lip-configuration (Photos. 130-133). She then opened her mouth slightly wider than the mother's. Immediately the mother opened her own mouth very wide (Photo. 134). At this point, Sarah closed her mouth, watching her mother's mouth with furrowed brows (concentration; Appendix 1). The mother held this open-mouth position for a period of two and a quarter seconds - towards the end of which Sarah opened her own mouth, imitating for a second time her mother's lip-configuration (Photos. 135-136). It was two-thirds of a second after Sarah opening her mouth that the mother began to attribute negativity to her:

"Oh! Tt! Are you very bored? Are you very bored?",

apparently interpreting Sarah's imitative movement as a yawn. But it was clearly not a yawn - there was no intake of breath, the mouth shape was less extreme than that of a yawn and it was associated with visual concentration rather than relaxation. While the

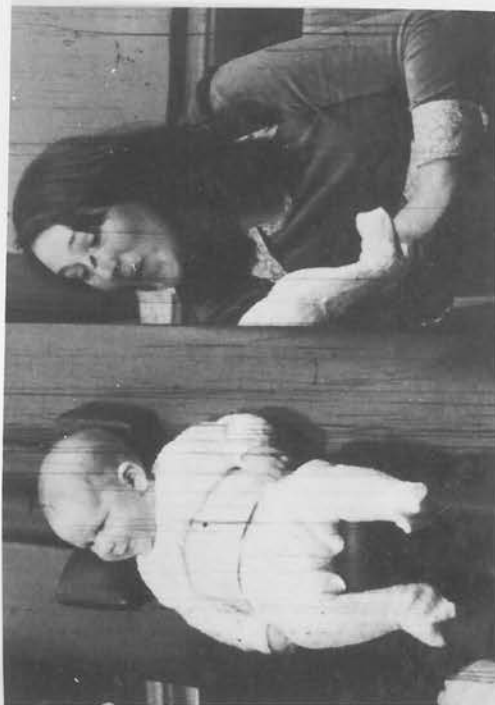
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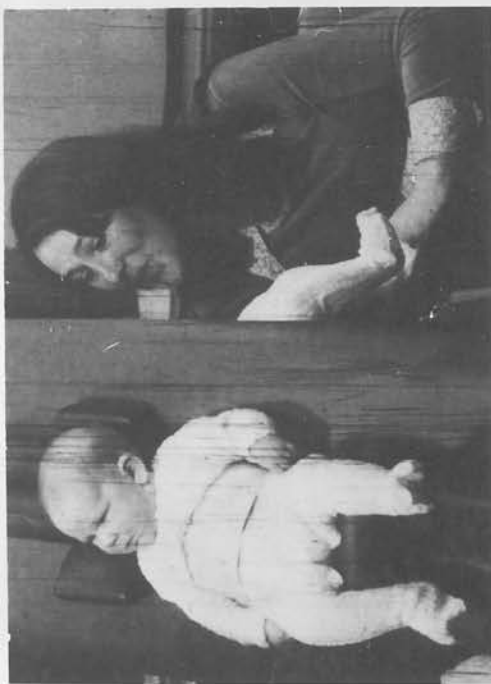


130



PHOTOS. 131-134 : Sarah imitates her mother's mouth-shape(131-133), then the mother exaggerates this imitation while Sarah watches(134) (Example iii).

131



132



133



134



PHOTOS. 135-136 : Further imitation by Sarah.

PHOTOS. 137-138 : Sarah's behaviour after her mother's misinterpretation of her imitations as 'boredom' :
prespeech(137) and turning away(138) (Example iii).

135



136



137



138



mother was making her comments, Sarah began to smile at her and then to gesticulate (Photo. 137). But the mother continued to remark that Sarah was bored with her, making three ostentatious mock yawns and saying:

"Are you very bored? Cheeky thing. Are you?
Hello. (mock yawns)".

At this point, however, Sarah's brow furrowed and, after 39 seconds of continuous visual attention, she turned away from her mother (Photo. 138). As if this were a confirmation of her previous suspicions, the mother immediately remarked:

"Tt! Are you very bored? You're very bored with Mummy's face really aren't you. Eh? You're bored with Mummy's face really. Yes. I don't blame you. I don't blame you. There must be more interesting things."

Contrast with other conditions. The only other condition recorded during this session was with a reaching stimulus (see Chapter 4). This received close visual attention from Sarah (78%), but no smiling or crying (duration: 213 seconds).

Conclusion. This is a particularly interesting interaction because the mother's Category 1 utterances clearly have their root in a misinterpretation of Sarah's behaviour. Sarah was accused of being bored with her mother's face during a period in which she was paying the closest attention to it. Indeed, Sarah's subsequent gaze aversion may have been due to the marked decrease of coordination between the mother's behaviours and Sarah's behaviours after the mother's first suspicion of negativity (cf. Photos. 129-136 and 137-138). This would accord with the findings of Murray reported in the previous chapter (pp. 221-223).

A possible explanation of this transformation in the mother's behaviour is that - after six minutes of talking - it was she, not her daughter, who was bored with the interaction. In accord with this explanation is the drop in her facial animation after Sarah's 'yawn' and the observation that, one second after Sarah's gaze-aversion, the mother also broke gaze to look in the mirror - apparently attempting to see what the experimenter was doing in the room behind her. If this explanation is correct, this example is an early illustration of what Zinner and Shapiro (1972) call 'defensive delineations'. Zinner and Shapiro deal exclusively with the family dynamics of 'problem' adolescents. They provide evidence that

"within the realm of parental behaviour are acts and statements which communicate to the adolescent his parents' image of him".

These acts are called 'delineations'. 'Defensive delineations' are the

"expression of parental defensive organisation and, as such, the parent is strongly motivated to sustain these perceptions of the adolescent, regardless of the adolescent's behaviour which might otherwise alter the parental image".

(iv) Sarah (aged 11 weeks)

Evidence for negativity. During this 277-second interaction, Sarah looked at her mother for 93% of the time and smiled 5% of the time. She also cried for 17% of the time - but all her crying came after the three Category 1 comments under discussion.

Evidence for selectiveness during the interaction. Sarah looked at her mother continuously from the beginning of the interaction until after the mother

had made the second of her Category 1 comments (i.e. for 49 seconds). Almost simultaneously with the onset of the first comment, Sarah began to smile - her fifth smile during the interaction. Yet, three seconds later, the mother repeated her statement that Sarah was not "talking" to her:

"You're not going to have a talk with me today.
(Sarah smiling) Hey. Sarah. Hello. O-wo-wo.
You're not going to have a talk to me today."

One and a half seconds after these comments, Sarah looked down at her hand. Her mother's babytalk continued:

"Do you not? (Sarah looks down) Aw-ba-ba-ba-ba.
Ba. Ba. Not going to have a talk to me today."

Contrast with other conditions. Sarah was also recorded in interaction with an unfamiliar adult during this session. She looked at this stranger - without crying - slightly less than at her mother (i.e. positive regard: M (87.5%), S (81%)).

Conclusion. As in Example (ii), it appears that the mother's Category 1 comments referred to her daughter's lack of vocal behaviour during the early part of this interaction. In this light, it is significant that, after saying "Not going to talk to me today", the mother's commentary continued: "Just gonna sit quietly. Are you?". Possibly this variety of Category 1 comment reflects a commonly-held belief that young infants cannot communicate until they start to make differentiated vocalisations. Alternatively, it is possible that, as is usually the case at this age (Lenneberg et.al. 1965), Sarah had begun to make more frequent positive vocalisations in the home and her

mother simply wanted her to demonstrate her developmental progress to those in the Psychology Department. But, in either case - and as in Example (ii) - this example suggests a narrowing of the mother's criteria for what it is for a baby to 'talk'. But, as shown in Tables 7/1-7/6, this narrowing only manifested itself as Category 1 comments in the babytalk of the mothers of Sarah and Joanna.

2. Discussion

These analyses show that mothers' responses to their infants are not always justified. But, more importantly, they suggest that the way in which mothers construe their infants' actions is both selective and systematic. It seems that each mother has a limited range of baby-related ideas in her head and it is these which determine the 'themes' of her babytalk - the range of purposes she attributes, or misattributes, to her child's behaviour (Table 1). But it is not only the mothers' babytalk which has these themes; their babytalk is systematically related to their behaviour. For instance, in Example (iii), Sarah's mother not only attributed boredom to her daughter verbally, but, simultaneously, began to act as if Sarah were bored with her. While infants are insensitive to the verbal content of babytalk, they are not insensitive to changes in the sense of their non-verbal behaviour (Chapter 5). And, as suggested by extension of Zinner and Shapiro's concept of 'defensive delineation', systematic changes such as those illustrated by Example (iii) may be the means by which infants begin to sense their parents' images of them.

3. Mirroring

This suggestion gives rise to the notion that the

TABLE 8/1: Scores for the use of different adjectives by different mothers whilst interacting with their daughters

ADJECTIVE	DAUGHTER					
	Sarah	Joanna	Angela	Leigh	Jakilene	Julie
Good	*	*	F	*		
Pretty			*			*
Clean			*			
Clever	*	*	*			
Chatty		*				
Little	F	*	*	*		
Big	*				*	*
Fatty					*	
Stupid					*	
Silly	*				*	
Cheeky	*			F		
Nosey				F	*	
Bad				*		
Slavery					*	

Key: * indicates use; F = frequent use (30+ uses).

reactions of others are, in certain respects, a 'mirror' held up to the baby, reflecting an image of self which he might appraise in much the same way as he would appraise another person directly. The notion of 'mirroring' goes back at least as far as the 18th century (Smith 1759; see McCall 1977). Thus Cooley (1902) called the 'social' self the reflected or "looking-glass" self. Cooley's ideas have gone on to play an important part within the tradition of social behaviourism (Mead 1934, Goffman 1957, Berger and Luckmann 1967). A more recent ^{psychological} formulation is that by Lacan (1949).

Lacan's conception of 'the mirror stage' in social development originated from an observation by Kohler. Kohler observed that, from the age of six months onwards human babies can recognise their image in a mirror. What is more, (unlike chimpanzees) human babies appear to be fascinated by this image; their recognition,

"far from exhausting itself, as in the case of the monkey, once the image has been mastered and found empty, immediately rebounds in the case of the child in a series of gestures in which he experiences in play the relation between the movements assumed in the image and the reflected environment, and between this virtual complex and the reality it reduplicates - the child's own body, and the persons and things around him".

Lacan represents the mirror stage as the child's first form of identification. Like Freud, he does not see the child's development as influenced by social factors until the point at which the Oedipus complex comes into operation. Thus, for him, the mirror stage is essentially an asocial phenomenon:

"the important point is that this [primordial identification] situates the agency of the ego, before its social determination, ... " (1949; my emphasis).

Recently, in accord with Klein's revision of Freud's theory of early development, Winnicott (1967) has revised Lacan's formulation to suggest that:

"in individual emotional development the precursor of the mirror is the mother's face" (his italics).

Thus Winnicott suggests that mirroring is a social phenomenon which begins at birth. For him, the first representation of the baby's 'self' is to be found in his or her mother's face, because, when a mother is looking at her baby,

"what she looks like is related to what she sees there" (his emphasis).

But, while mothers do often imitate their babies' expressions (Trevarthen 1974 1977, Kaye 1979), they are not always doing so. Winnicott suggests that, if these lapses become predictable, they begin to constitute a form of "relative maternal failure". In Lacan's terms, these 'failures' are akin to the physical distortions intrinsic to mirror-images, in which the infant's body appears to him

"in a contrasting size that fixes it in a symmetry which inverts it - in contrast with the turbulent movements which the subject feels are dominating him" (Lacan 1949).

Thus Winnicott writes that, when a mother's face reflects her own moods rather than her baby's moods, the babies

"study the object [i.e. the mother's face], and do all that is possible to see in the object some meaning that ought to be there if only it could be felt. Some babies, tantalised by this type of relative maternal failure, study the maternal visage in an attempt to predict the mother's mood, just exactly as we all study the weather ... Immediately beyond this in the direction of pathology is predictability, which is precarious, and which strains the baby to the limits of his or her capacity to allow for events. This brings a threat of chaos, and the baby will organise withdrawal, or will not look except to perceive [i.e. as opposed to apperceive], as a defence" (my emphasis).

In 1978, Sylvester-Bradley and Trevarthen suggested that the notion of mirroring might be extended to include both the mother's non-verbal behaviour and her babytalk (Appendix 3). In the light of the analyses of babytalk reported in this and the previous chapter we can make this a firmer proposal. We can agree with Lacan that mirroring plays an important role in early development, and we can agree with Winnicott that mirroring is a social not a physical phenomenon. But our examples show that mirroring does not just involve the mother's face, it involves her ideas as well. In this sense, the mother's facial expressions are not simply facial expressions, they are signs - tokens for something else. Therefore we must conclude that mirroring is not just a social phenomenon, it is also an ideo-logical phenomenon.

4. Theoretical Repercussions

If pursued, the argument that mirroring is an ideological phenomenon has many theoretical repercussions. Thus, in the first place, it might suggest that 'unjustified' mirroring of the baby's actions is ideologically inspired whereas 'justified' mirroring is more a product of the parent's 'natural' interpersonal sensitivity.

Such a dichotomy would be mistaken however, for ideology and interpersonal sensitivity are often combined in adult-infant interactions. An example is the case when, during a face-to-face interaction, Angela's mother crooned "Who's Mummy's pretty girl?" on seeing Angela smile. Clearly this utterance was, in interpersonal terms, an expression of the mother's sympathy with her baby. But the utterance was also 'ideological' in the sense that it is intimately related to Western ideas about womanhood and possession - the idea that babies 'belong' to their (biological) parents, the importance of prettiness for a woman's well-being and the pleasure that a woman is supposed to derive from affirmations that she 'is' pretty. Thus one must conclude that any adult response to a baby potentially has both interpersonal and ideological determinants and that this will be true of both 'justified' and 'unjustified' responses; for instance, in Example (iii), Sarah's mother was not only misinterpreting her daughter's behaviour in describing it as 'bored', she was also expressing her own boredom.

This conclusion suggests that any adequate account of social influence in early interactions should, in contrast to Cooley, Lacan and Winnicott, draw a distinction between the effects on babies of adults' actions as self-expressions and the effects on babies of adults' actions as 'mirrored' reflections of the babies' actions. This need not mean that babies sometimes perceive others' actions as reflections of their own actions and, at other times, perceive them as self-expressions - interaction may simultaneously lead to the acquisition of ideologically-inspired social knowledge.

These suggestions have an important bearing on Marxist theories of consciousness. For example, it seems likely that mirroring is one means by which infants are initiated into what is called by Marxists 'behavioural ideology'

(Volosinov 1976). This, in turn, suggests that baby-talk is a precursor of 'inner speech' (cf. Vygotsky 1962). But our argument also suggests an important addition to Marx's claim that consciousness is "from the very beginning a social product" (Marx and Engels 1970). This is often taken to mean that the contents of consciousness are wholly a product of social conditioning. But our argument suggests that there is an aspect of consciousness which is present from soon after birth and which is responsible for the immediacy and richness of responses between infants and adults, an aspect of consciousness which predetermines socially-produced consciousness and the 'mirroring' which gives rise to it. This conclusion by no means undermines all Marx's statements - such as that an adequate scientific method must:

"set out from real active men, and on the basis of their real life-process, demonstrate the development of the ideological reflexes and echoes of this life-process" (op.cit.)

- so long as one accepts that 'the life-process' incorporates its own form of consciousness or awareness. Marx himself did accept this, at least in his early writings:

"Consciousness is at first consciousness concerning the immediate sensuous environment and consciousness of the limited connection with other persons and things outside the individual who is growing self-conscious" (op.cit.; his emphasis)

But, unfortunately for the development of socialism, Marx did not consider that this primordial form of

consciousness warranted theoretical attention and, since 1860, it has been consistently neglected by Marx and Marxists alike.

The proposition that there are two aspects of human consciousness, a 'given' aspect and an aspect which is the product of social influence, does not only apply to Marxist theory. It also concerns a central issue in psychoanalysis: namely, the origins of the unconscious.

For Freud the unconscious was engendered in the resolution of the Oedipus complex. Thus the pre-Oedipal child is held to desire exclusive possession of or union with the mother. But, during the Oedipal phase, this desire is recognised to be dysfunctional. Instead, the child looks to gain vicarious satisfaction by identification with his father or her mother: the social role of the same-sex parent comes to symbolise fulfilment of the child's original (sexual) desire for the mother. It is the misrecognition of the same-sex parent's desire as the child's own desire - combined with the repression of the child's true desire - which is held to constitute the unconscious.

As Lacan points out, the identification which resolves the Oedipus complex bears a formal similarity to identification in 'the mirror stage': the playing of a (social) role comes to take the place of the child's immediate experience and feelings:

"the insertion of the subject into the symbolic order underlying the social organisation by the Oedipus is simultaneous with a division between the I of existence and the I of meaning" (summarised by Lemaire 1977).

In the light of our findings and discussion, we can suggest that what Lacan refers to as the 'I of

existence' is the immediate sensuous awareness we have of our own acts and the world about us, while what he refers to as the 'I of meaning' is the form of consciousness constituted by our identifications with what we are mirrored as by others. In this case, 'the unconscious' is formed by identification with other people's images of us insofar as this identification excludes or represses our natural awareness of our own and others' acts as self-expressions.

In semiological terms, this conclusion suggests that the 'social' self may become a myth. As Barthes (1973) writes, the principle of myth is that "it transforms history into nature". Thus, just as a magazine cover featuring the picture of a negro saluting a French flag makes the life-history of the negro irrelevant, so our socially-produced 'self-identity' takes the place of - alienates us from - the real actions and events which gave rise to it:

"In passing from history to nature, myth acts economically: it abolishes the complexity of human acts, it gives them the simplicity of essences, it does away with all dialectics, with any going back beyond what is immediately visible, it organises a world which is without contradictions because it is without depth ..." (1973: 143)

Thus, insofar as one feels that and acts as if one is what one is appraised as by others - insofar as one sees one's 'social' self as one's only self (I am clever, I am kind, I am stupid, I am ugly) - one is 'misrecognising' one's history as one's nature because one fails to recognise the historical determinations of the way one is behaving. Under these conditions, one's unconscious would represent a record of the reasons one had lost awareness of one's own and others' acts as self-expressions; it would be these which were elicited by

free-association during the course of psychotherapy. But this means that the unconscious must also 'contain' evidence that one has such an awareness to be lost. In fact, in a negative way, its existence is that evidence.

It is this fundamental, positive aspect of the unconscious which psychoanalysts such as Freud and Lacan overlook. Freud (1930) believed that the social repression of one's 'instinctive' feelings was a necessary precondition for civilization. Lacan (1953) goes one step further, stating that "the unconscious is the discourse of the other" and thereby apparently denying the aspect of the unconscious which bears testimony to the historical occurrence of a genuine discourse, even in a repressed form.

Perhaps surprisingly, Lacan's position is closely related to that represented by the tradition of social behaviourism. For example, Goffman (1957) reaches the conclusion that

"in analysing the self, we are drawn from its possessor, from the person who will profit or lose most by it, for he and his body merely provide the peg on which something of collaborative manufacture will be hung for a time. And the means for producing and maintaining selves do not reside inside the peg; in fact these means are often bolted down in social establishments".

For Goffman, individuals are merely the performers of externally-supplied roles, and all their psychobiological predispositions to social relationship "seem to arise out of intimate interaction with the contingencies of staging performances".

Our argument suggests that the views of Goffman, Lacan and Freud are mistaken. Thus, they ignore the primordial sensitivity to others which the logic of their argument implies (e.g. 'the discourse of the other' implies a primordial self which is capable of discourse),

and which can be shown to exist as early as the second month of life (Chapter 5). Perhaps as a consequence of this neglect, their views seem unduly pessimistic: they seem to deny the existence of the genuinely spontaneous creative awareness which leads to love of our fellows and understanding of the world as well as the virtue which consists in what Winnicott calls "the experience of aliveness", and which he sees as the fundamental sub-stratum of the human psyche (Winnicott 1960b 1971).

5. Conclusion

Finally, we must return to our data. As argued in the foregoing section, it is important to recognise that mirroring is not only an ideological phenomenon. This recognition leads us to develop the usual theoretical conceptions of social influence. In the first place we must admit that, insofar as the way adults interact with infants is determined by categorical delineations of them as well as by the interpersonal significance of their complex and immensely variable interactive displays, then these delineations, by the processes of identification described by Lacan (1949), provide the basis for the construction of a 'social self' - a set of social roles based on the assimilation of others' images of one's own actions. As Winnicott (1960b 1967) suggests, unjustified reflections of one's actions may, by means of identification with them, lead to the construction of a 'false' social self. But to suggest that socially-derived knowledge is always false would clearly be a misrepresentation of our data. Thus, of Category 1 comments recorded during this study, the majority were seen to be justified by subsequent analysis of the infants' behaviour to which they referred (Chapter 7). Even the most obvious exception (Example (iii)) was preceded by a long period during which the mother demonstrated the closest sensitivity to the subtleties of

her daughter's interactive display (Photos.128-135).

Thus the contribution of the concept of mirroring to our understanding of the developmental effects of early social influence is less to suggest that others' actions form the basis for the construction of a 'false' social self - contrasting with the 'true' given self of natural awareness (as suggested by Winnicott 1960b) - than to suggest that social development has two aspects: an 'active' aspect in which baby and adult meet and interact with each other as self-expressive agents and a 'passive' aspect by which these interactions lead to the assimilation of ideologically-structured social knowledge. Clearly, in the first instance, interactions may be either positive (warm, facilitating) or negative (unsupportive, debilitating). But social knowledge may also play both positive and negative roles in development. Thus, to 'misrecognise' social definitions of self as absolute or natural is to repress one's awareness of self and others as self-expressive agents. Alternatively, socially-derived self-knowledge will often contribute to the success and controllability of one's social interactions: for example, awareness of one's social definition as 'stupid', 'clever', 'pretty', 'black', 'fat' or 'ugly' may enable one to take steps to overcome the interactive handicaps with which such labels are likely to endow one. In this way, mirroring may lead to an increase in the individual's social skills and thus, his or her powers of self-determination.

Chapter 9: DISCUSSION AND CONCLUSIONS

This chapter sets the findings of the study in a theoretical perspective derived from the philosophy of Baruch Spinoza. The perspective is described in order to reconcile by the simplest possible means the various insights contained in what has so far been discussed.

1. Summary of findings

The empirical data incorporated in this thesis have been produced from the fine-grain analysis of audio-visual recordings of infants interacting with adults and a limited range of other stimuli under naturalistic laboratory conditions. The aim of the study as a whole was to investigate the development of infants as social beings during the first six months of life.

The empirical part of the study was prefaced by an

experiment comparing two-month-olds' behaviour with their mothers and with a graspable ball. Results showed that there are statistically significant differences in the behaviour that young infants direct towards people and the behaviour they direct towards things. These differences were not categorical however and it seemed that the results were confused by the fact that some infants were in a sociable mood - manifested by prespeech behaviour, smiling and eyebrow-raising - which lasted throughout both the experimental conditions. This finding, together with the interpretive ambiguity of all purposive behaviour, suggested that the question whether or not young infants are socially sensitive could only be answered by the analysis of recordings of infants interacting with others (a) when the infants were in a sociable mood and (b) when the analytic method was of sufficient observational and interpretive exactitude to draw unambiguous conclusions about the psychological sense of the infants' behaviour.

An analysis of this sort was reported in Chapter 5. It produced conclusive evidence of a two-month-old's sensitivity to the interpersonal significance of spontaneous actions by her mother. This baby was shown to welcome her mother's company and to enjoy her humour, she felt upset when ignored in favour of another, she disliked her mother's loss of interest in interacting with her, was pleased when this interest was renewed and was disconcerted when her mother became over-assertive. These descriptions were supported with detailed descriptive evidence. A supplementary experimental study showed that, on the basis of these descriptions, naive independent judges reliably coded the infant's behaviour according to a predictable pattern. This constituted additional evidence for the

existence of a comprehensible and complex social sensitivity to other persons in the first two months of life.

Having shown the existence of interpersonal sensitivity in young infants, the major study of the thesis concentrated on its development. Results reported in Chapter 6 show that this sensitivity does not necessarily result in harmonious interactions during the first six months of life. After a peak of social interest - or, in terms of Chapter 4 - after the prevalence of a predominantly social mood between six and ten weeks of age, recording sessions showed a decline of interest in conversational interactions with both mothers and strangers as well as in looking at familiar and unfamiliar face-masks. This decline was particularly marked with mothers. On the other hand, babies generally smiled and laughed at their mothers more than in other conditions. Whereas these findings cannot be explained by the usual theories of infant attention (i.e. the discrepancy hypothesis and arousal theory), they are all consistent with the idea that infants derive pleasure from increasing their control over and understanding of their surroundings. This would explain their enjoyment in game-playing - where adults make their actions more obviously predictable to babies; their greater pleasure (i.e. smiling) in interacting with their mothers than with other stimuli - because they have greater familiarity with and therefore understanding of their mothers (N.B. only Angela smiled less at her mother than in other conditions and she was primarily looked after by nannies; see p. 194); their general decline of interest in all stimuli with age - as their visual and motor systems mature, giving them a wider range of interests and powers, and the particularly marked decline of

interest to mothers - because mothers, in more zealously following up the experimenter's instructions to 'chat with' their daughters, would tend to frustrate the natural broadening of the infants' interests in the external world, and the infants, thus frustrated, would, through innate obstinacy or 'negativity', make more persistent attempts to evade their attentions than in the other conditions. This last proposition led on to a special study of negativity in early infant-adult exchanges (Chapter 7). After detailed analysis of interactions including persistent refusals or shutting out of contact with others, it was concluded that negativity was indeed a reaction to the frustration of the infant's will - their powers of self-determination or 'lack of self-knowledge'. The early occurrence of such behaviour contradicted views promulgated by many theorists, including attachment theorists and psychoanalysts such as Rene Spitz. Interestingly, some of the behaviours which manifest early negativity are closely related to those which manifest childhood autism (e.g. Hutt and Ounsted 1970).

Finally a number of systematic misinterpretations by mothers of their infants' behaviours were discussed. These were shown to constitute an early form of delineation or distorted reflection of the infants' behaviours which, by means of the processes of identification discussed by Lacan (1949) and Winnicott (1967), suggests the mechanism for an important form of social influence on development in early infancy; namely, 'mirroring'.

Taken together these findings show that young infants are social beings in the sense that they are capable of interacting with others although they may be unaware of the specific conventions of the society in which they live. This conclusion contrasts with that put

forward by theorists such as Schaffer (1977b) and Kaye (1977) who claim that, while infants are born with basic physiological predispositions to dyadic interaction, they are not capable of genuinely interpersonal exchanges until the end of the first year. The findings of this study also contrast with the views put forward by both psychoanalysts such as Klein (1953b) and attachment theorists, who argue that babies form a bond to their mothers on the basis of unitary 'instincts' or simple reflex-like behaviour patterns which promote proximity to the mother. We have seen that early infant-adult interactions are highly variable in behavioural constitution, incorporating a wide range of positive and negative contributions from the baby. On the other hand, this study generally supports the claims made by Trevarthen that there is a precocious social expressivity and sensitivity to other persons in early infancy which is most evident, in the first six months, before ten weeks of age. It also supports Trevarthen's claim that there is an increase in negativity between ten and twenty-eight weeks of age. However, it does not seem that the playing of person-person games and object-person games is paramount in the resolution of young infants' negativity - negativity may have a wide range of causes. Nevertheless, the demonstration that young infants have a precocious interactive competence is important for theories of language acquisition and socialisation in which the existence of a form of 'intersubjectivity' is often assumed without empirical verification (e.g. Ryan 1974, Newson 1979). But a much more extensive study than that reported here would be needed to know whether it is possible to distinguish different mental attitudes of "assertion, seeking for information, wishing to have others perform certain acts etc." which Macnamara (1972) suggests to underlie the development of different types

of speech act. And while we have suggested one means by which infants may become subject to social influence (i.e. mirroring), we are still ignorant as to how one might distinguish the different roles played by direct person-to-person interaction and by identification in social development.

In view of the diversity of theoretical significances attaching to the work reported in this thesis, an attempt has been made to derive a more all-embracing perspective from the psychological philosophy of Spinoza.

2. The psychological basis of Spinoza's philosophy

Spinoza's most important work, "Ethics" (1910), is prefaced by the description of a metaphysical system: "Concerning God". This is followed by two psychological sections: "Concerning the nature and origin of the mind" and "Concerning the nature and origin of the emotions". The last two sections describe the consequences of this psychology for everyday life and are entitled, respectively, "Of human servitude, or the strength of the emotions" and "Concerning the power of the intellect, or human freedom".

As has been remarked by many commentators, Spinoza's psychology closely resembles Freud's theory of the mind (e.g. Hampshire 1951). But, while according with the type of psychical causality invoked by Freud to explain his empirical discoveries, Spinoza's theory resolves the paradox at the heart of psychoanalytic theory; namely, its inability to explain the dynamics by which analysands are 'cured'. This paradox is very obvious in analysts' attempts to explicate their methods of treatment.

Freud (1912) tells us that the psychoanalytic method

depends on one fundamental principle: that the analyst

"must adjust himself to the patient, as a telephone receiver is adjusted to the transmitting microphone ... so his unconscious is able, from the derivatives of the unconscious which are communicated to him, to reconstruct that unconscious which has determined the patient's free associations".

Thus the psychoanalytic method depends primarily on a simple belief that there is something 'behind' what patients say in the analytic situation, something which Freud called 'the unconscious'. All Freud's theoretical writings concern the behavioural significance of the role played by the unconscious in the workings of the human mind. Yet - and here is the paradox - when Freud came to discuss the success of interpretations made during analysis, it appeared that this was not a theoretical matter. The criteria of analytic success cannot be theoretically determined; they are found to depend ultimately on the reactions of the analysand. Thus a psychoanalyst might try a number of interpretations of a dream-image before coming up with the right one:

"no damage is done if, for once in a way, we make a mistake and offer the patient a wrong construction as the probable historical truth. A waste of time is, of course, involved, and anyone who does nothing but present the patient with false combinations will neither create a very good impression on him nor carry the treatment very far; but a single mistake of the sort can do no harm. What in fact occurs in such an event is rather that the patient remains as though he were untouched by what has been said and reacts to it with neither a 'Yes' nor a 'No'. This may possibly mean no more than that his reaction is postponed; but if nothing further develops we may conclude that we have made a mistake and we shall admit as much to the patient at some suitable opportunity without sacrificing any of our authority." (Freud 1937a)

Thus no theoretical 'read-out' of a dream - or any other psychical event - is possible. As Freud writes in "Die Traumdeutung":

"my procedure is not so convenient as the popular decoding method which translates any given piece of a dream's content by a fixed key. I, on the contrary, am prepared to find that the pieces of content may conceal a different meaning when it occurs in various people or in various contexts."
(1900: 179)

In the final analysis, this dependence on the cooperation of the patient means that, if the patient refuses to accept an interpretation which the analyst 'knows' theoretically to be true, the treatment must grind to a halt. For Freud, this was often the case, particularly when he insisted on the existence of castration-anxiety in men and penis-envy in women (Freud 1937b).

Freud's inability to account for his dependence on patients' responses in practising psychoanalysis points to two deficiencies in his theory. The first concerns his dogmatic insistence on the importance of infantile sexuality in human development: this was the usual 'sticking-point' in his patients' progress towards a cure. But secondly, and more radically, it seems that psychoanalytic theory must seriously underestimate the importance of self-will or motivation in the operation of the human mind.

Will is one of the bases of Spinoza's psychology. His metaphysics led him to believe that

"the endeavour wherewith each thing endeavours to persist in its own being is nothing other than the actual essence of that thing" (1910, Part III; prop.7),

and that, when this endeavour has reference to the mind, it is called will. (When it has reference to both the mind and the body, it is called either desire or appetite, depending whether we are conscious of it or not.)

The other bases of Spinoza's psychology are, first, his conception of emotion and, secondly, his conception of freedom. By emotion, he understood

"the modifications of the body by which the power of action in the body is increased or diminished, aided or restrained, and at the same time the ideas of these modifications" (1910, Part III; def.3).

Thus there is no distinction between thought and emotion. Every modification of the body involves a modification of ideas in the mind and vice versa, or, as John Macmurray (1937) puts it, reason is a form of emotion and emotion is a form of reason.

For Spinoza, freedom is life according to the dictates of reason. He summarises what he means by 'the dictates of reason' as follows:

"Since reason postulates nothing against nature, it postulates, therefore, that each man should love himself, and seek what is useful to him ... and desire whatever leads man truly to a greater state of perfection, and, finally, that each one should endeavour to preserve his being as far as it in him lies ... Again, as virtue is nothing else than to act according to the laws of one's own nature, and no-one endeavours to preserve his being save according to the laws of his own nature, it follows hence, firstly, that the basis of virtue is the endeavour to preserve one's own being, and that happiness consists in this, that man can preserve his own being ... "

In other words, virtue, happiness and freedom all flow from accordance with one's own nature insofar as one's

nature 'preserves its own being' or, is self-determining. (This formulation differs from commonly held conceptions of 'free will'. 'Freedom of the will' does not mean that the will becomes an 'uncaused cause': it refers to a state of physical and mental being which is the necessary product of living in accordance with one's will. Thus, while the activity of the will may correspond to an experience which we call 'freedom', this experience and the operation of the will is no less causally determined than any other experience or mental activity.)

Spinoza's conception of freedom leads him to make a distinction between active and passive emotions (or actions and passions). We act or are active when something takes place in us or outside of us which is clearly a product of our nature. On the other hand, we suffer or are passive when something takes place in us or follows from our nature of which we are only the partial cause. This distinction leads on to a series of propositions concerning the importance of understanding in human development: because modifications of ideas and of the body always correspond, it follows that actions, which reflect one's nature, will incorporate ideas which reflect one's nature. But, as ideas which reflect nature are true ideas, increased freedom depends on the acquisition of true or adequate ideas. It is in this sense which freedom is life according to the dictates of reason. On the other hand, passiveness or servitude is to be explained by the possession of inadequate 'received' ideas which are not members of the self-generating series constituting one's mind, but are the products, at least in part, of external causes. For this reason, one's ordinary hates and loves, desires and aversions, succeed each other without any internal logical connection between

the ideas connected with them.

Spinoza's psychology suggests that Freud's paradoxical dependence on his patients' reactions for therapeutic success reflects his neglect of the importance of Spinoza's equation between mental well-being and self-determination. This suggestion leads on to the proposition that the difference between the unconscious and the conscious is not 'structural' but personal or moral. Repression, sublimation, inversion, splitting, idealisation and their like are not impersonal 'mechanisms' but genuinely personal activities, the purpose of which is to maintain a distinction between self-determination and the consequences of passivity. Spinoza's philosophy, and the writings of many moralists (Huxley 1945), stress that the maintenance of such a distinction is not always psychologically necessary, provided that one is prepared to take on the arduous task of what Aldous Huxley (1923) concludes would be "living in an unheard of manner", that is, of accepting as true and acting on propositions such as those which make up Spinoza's "Ethics". Such a task would be arduous because it would lead one to oppose external forces which frustrate one's own and others' powers of self-determination - both in close personal relationships and in society at large.

3. The theoretical significance of the findings

We are now in a position to discuss the contribution which Spinozan psychology can make to the understanding of the findings reported in this thesis.

a. The development of 'active emotion'. The findings in this thesis support the view that young infants manifest a natural tendency to maintain and increase their powers of self-determination. Thus we have seen how, from an early period of high social interest (Chapters 4, 5 and 6), infants became progressively more selective about what they attended to and about

how they interacted with what they attended to (Chapter 7). This progress is most obviously manifested by the early incidence of negativity: infants not only have means to shut out contact with unwanted entities but actively use these means when in conditions which frustrate their interests from the third month of life onwards.

At first sight, it might be thought that negativity was essentially counter-productive so far as social development is concerned, tending to reduce interpersonal exchange, to lead to separateness and to cause sadness, guilt and depression in others. In the light of the analyses presented in Chapter 7 however, it seems that negativity is not necessarily unproductive so far as either infants or their caretakers are concerned. In the first place, to treat negativity as a personal comment directed specifically at oneself is to misunderstand it. Negativity appears to be a product of the infants' inability to act in the way they want to or to maintain their will in the face of frustrating external circumstances. Understood as such, it should provoke active attempts to discover and facilitate the fulfilment of the infant's purposes whenever these are compatible with the caretaker's own purposes. If the caretaker's attempts are successful, negativity will have productive consequences for the infant as well as the caretaker. But, as all caretakers know, discovering what will comfort an unhappy baby is often a very difficult task. While this thesis confirms that babies can be cheered up by specific caretaker-interventions, - such as the initiation of game-playing - it remains to be seen whether developmental psychologists can subdivide negativity into a number of genuinely different taxonomic 'types', each with specific diagnostic features and specific means of resolution.

Spinoza was what is known as a 'logical monist'. This means that he believed the division between 'mind' and 'body' - or between 'psychology' and 'physiology'

- merely to reflect two ways of conceiving what is in fact the same substance, namely, human being. While this is only one amongst a number of possible understandings of the mind-body distinction, it shows that there need be no contradiction in claiming, as in Chapter 6, that, in the early months, the development of active emotion is the same thing as the increasing power and differentiation of the infant's developing visual and motor systems: these 'two' developments may be just different attributes of the same growth-process. Thus, infants do 'psychologically' develop a wide range of interests during the early months, both in different sorts of interaction with persons and in the investigation and manipulation of their non-social surroundings. But these developments must also have 'physiological' attributes, with corresponding developments in the brain and central nervous system.

In the study reported in Chapters 6 and 7, the infants' interests first appeared to be in relatively passive interactions with their environments but, with age, infants become increasingly interested in the active control of what is going on around them. This development is exemplified in the social sphere by their growing pleasure in games. It is exemplified in the non-social sphere by visual investigation of their surroundings, by the development of directed reaching, grasping and sucking of objects, as well as by experiments showing the apparently spontaneous interest infants take in acting so as to solve abstract contingency problems (see p.23 above; Papousek 1969, Watson 1972).

b. Intersubjectivity. Spinoza argues that the essence of human nature is self-maintenance and that individual development consists in the increase of the power of self-determination or 'active emotion'. But self-determination appears in his writings to be an

essentially asocial phenomenon. How then are we to account for evidence that there is a complex social sensitivity in the first two months of life (Chapter 5)?

While Spinoza stated - in what seems, at first sight, an apotheosis of selfishness - that a free man is one who loves himself, seeks what is most useful to himself and preserves his own being, he went on to remark that

"we can never bring it about that we need nothing outside ourselves for our preservation, and that in order to live we need have no commerce with things which are without us. If, moreover, we looked at our minds, our intellect would be more imperfect if the mind were alone and understood nothing save itself. Many things are therefore without us which are very useful to us, and therefore much to be desired. Of these, none can be considered more excellent than those which agree with our nature.

For (to give an example) if two individuals of the same nature were to combine, they would form one individual twice as strong as either individual: there is nothing more useful to man than man ... From which it follows that men who are governed by reason, that is, men who, under the guidance of reason, seek what is useful to themselves, desire nothing for themselves which they do not also desire for the rest of mankind, and therefore they are just, faithful, and honourable." (my emphasis)

What this statement suggests in the context of this thesis is that the infant's tendency towards self-determination will necessarily lead the infant into increasing involvement with other human beings. This is because, in the first instance, individual human beings have only finite powers. This means that, if individuals join up with others of the same nature as themselves, their powers will be multiplied. Thus, the logic of self-development implies increasing the depth and extent of one's combinations with others. In this light, infants' early interest in social interaction is a necessary product of their tendency towards self-determination. But Spinoza's argument does not only

apply to humans; it applies to all living beings. Thus we may assume that, throughout the evolutionary history of the human species, there has been a consistent pressure towards combination with others which has led to the endowment of infants with a range of specifically social skills which underlie the precocious social expressivity and sensitivity to other persons described in this thesis. It is these evolutionarily-endowed social skills which would constitute what Trevarthen calls a 'faculty for intersubjectivity'.

c. The development of 'passive emotion'. It might appear that, given the natural tendency for infants to increase their capacity for active emotion - and thus their freedom and happiness - that, by adulthood, human life should be extraordinarily pleasant. The fact that this is not always the case reflects the fact that human beings are unable to control all the external influences to which they are subjected. This is particularly the case in childhood, when individuals' powers are particularly limited. It is also a necessary consequence of individuals' involvement with other people, insofar as other people cannot always be sensitive to others' needs. In fact, because the human world is mainly a social world, the main source of external influence on individuals' behaviour is likely to be social.

In Chapter 8 it was suggested that an early source of external influence is incorporated in the 'mirroring' behaviour of others, insofar as this behaviour reflects socio-ideological forces rather than direct self-expression. While it was not found possible to draw a distinction between these two different aspects of early infant-adult interactions on observational grounds, Spinoza's psychology would suggest that, when able actively to pursue their own interests, infants will perceive and act on others' actions as self-expressions but, when

'passive' or unable to pursue their own interests, others' actions cannot constitute support for the infants' actions and will thus come to constitute only reflections of the infants' current (passive) attitudes to the world. Thus if, under these circumstances, and as proposed by Cooley and Lacan, children begin to assimilate and identify with the images which are most consistently projected onto them then, in being externally determined, their behaviour will become progressively more the product of ideas which are not wholly determined by their own natures, being also the product of society. But while, in Winnicott's (1960b) terms, ideologically inspired mirroring may, if inaccurate, lead to the assumption of a 'false' self - with pathological consequences - Spinoza's theory would suggest that social definitions may play a positive as well as a negative role in self-development. They will play a negative role insofar as they are taken as absolute and allowed to determine individuals' actions. But the social knowledge derived from mirroring may also provide the basis for increased understanding of others' reactions to oneself and thus for the development of increasing skills for the fulfilment of one's purposes in the social world.

d. Conclusion. This thesis has been concerned with the nature of early social development. The conclusion to be drawn from it is that the development of young infants as social beings is but one aspect of the all-embracing process of their development towards greater self-determination as persons. But it follows from our argument that, if this process is to be fruitful, its most important outcome will be the development of a richer and more consistent communion with others. Nevertheless, while development will, to a large extent, depend on the development of social skills and the

acquisition of social understandings, these will only be valuable in the same way as all skills and knowledge are valuable, that is, insofar as they facilitate individuals' desire to attain and preserve as great a state of perfection as is possible for human beings.

4. Implications for future research

The increasing scientific interest in early infancy which has characterised the past decade of research on human development has revealed an unsuspected psychological precocity. As we begin to understand infants, we begin to understand that there is a large measure of unity in their being and our own. And, although we understand little, what we do understand suggests that we must relinquish old methods of research if our knowledge is to increase.

The findings of this study have been based on the rejection of the usual experimental method of research - which produces normative statements about development - in favour of the a posteriori, forensic analysis of audio-visually recorded data. The most important advantage of the forensic method over the experimental method is that it allows us, as scientists, to place the highest meaning on what we observe. This should mean that a whole new range of questions about development can be answered by empirical research. The answers offered in this thesis are few and, as with all psychological 'answers', necessarily tentative. Yet they do open up a number of avenues for further investigation.

First, let us take negativity. We have seen that negativity is an important feature in early infant-adult exchanges and that it is sometimes susceptible to 'cure' by specific interventions on behalf of caretakers. But we do not know why certain interventions

are sometimes successful and, at other times, unsuccessful. It is possible that further research would show that early negativity can be split into a number of sub-categories - for example, of 'fearful' negativity, based on infants' incomprehension of environmental changes (as in Lynne Murray's experiments; see also IA4 in Chapter 5), and of 'aggressive' negativity based on infants' frustration with the current state of their environment (as described in the examples presented in Chapter 7). Such a demonstration would not only be of theoretical interest, bearing for example on the genesis of emotion. It might also prove of practical assistance to those actively engaged in the round-the-clock task of looking after young babies.

There is also more research needed on the positive aspect of infants' interactions with others. In this thesis we have presented one analysis of a section of one interaction between a nine-week-old and her mother. This showed close sympathy and a range of interactive responses by the baby. Further examples of this sort, from the behaviour of other babies and with babies of different ages, would throw light on the important problem of distinguishing the effects of 'temperament' from the effects of 'mood' on studies of and issues in the development of the psyche. The significances of 'moods' or 'changes of interest' in determining infant behaviour were touched upon in the discussion of the findings reported in Chapter 6 (see pp.213-215 and Fig.6/7) as well as in discussing the variable effectiveness of different 'cures' for negativity in Chapter 7. Further analyses along the lines of that presented in Chapter 5 might lead to an extension of the taxonomy of negativities, posited in the foregoing paragraph, into a more general taxonomy of both positive and negative states of mind in infancy. If this were possible, different temperaments might come to be

distinguished in terms of different 'dominant' moods or of characteristic constellations of moods. Alternatively, it might be found that the concept of 'mood' so oversimplifies the variability of infants' behaviours that a more dynamic interpretation is required - for example, in terms of the logistics of the particular interpersonal transaction which provides the context for the behaviours being observed.

This sort of analysis might lead on to a more general project. It has been assumed throughout this thesis that the complex social sensitivities of young infants are only possible if infants see others as constituting, in some sense, 'goal-directed' or 'purposive' agents. Only on this assumption do the everyday interpersonal terms which have been shown reliably to describe infant behaviour (pp.156-177) make sense.

The meaning of the word 'purposive' has been defined deliberately loosely (p.61): no attempt has been made to investigate to what extent infants understand others' purposes and intentions. Yet social development must partly consist in the understanding of more and more complex intentions by the child. Longitudinal series of analyses, such as the analysis reported in Chapter 5, might begin to throw light on how this aspect of social understanding develops.

Two further issues arise from Chapter 8. The first concerns normal development. It has been argued in Chapter 8 that infants are immersed in ideology by means of the assimilation of systematic constructions of their actions by adults during face-to-face interactions. This hypothesis would predict that, in early infant-adult interactions, there should be specific sets of ideologically-inspired responses to babies' actions which correspond to dominant attitudes in the prevailing culture and differ between cultures - with

respect to sex-roles or the significance of personal possessions and private property, for example. The mirroring-hypothesis might thus give rise to a series of longitudinal studies designed to illuminate the behavioural basis for the internalisation of specific cultural attitudes. Clearly, if this could not be done parsimoniously, the mirroring-hypothesis would have to be abandoned in favour of simpler explanations for the acquisition of social knowledge (parental instruction, for example).

The second issue arising from Chapter 8 concerns pathology. As shown in Chapter 8, not all parental delineations of babies' behaviours are 'justified'. And as argued there, 'unjustified' reactions to babies' behaviours will be the reflection of particular forms of parental self-expression. One might suggest therefore, that the forms of self-expression which correspond to unjustified interpretations of infants' actions must all, for some reason, exclude the parent's sympathy with the infant. If this is the case, one would predict that abnormal states of mind, such as post-partum depression, would be associated with a high level of inaccurate mirroring of babies' behaviours by the sufferer. One would also predict that children who were subjected to continued distortions in their caretaker's interpretations of their behaviours would, more frequently than other children, develop a pathologically 'false' sense of self, as suggested by Winnicott (1960b 1967). This aspect of the mirroring-hypothesis could be tested by long-term case-analyses of 'at risk' infant-caretaker pairs. If supported, it would provide an important addition to our understanding of the genesis of pathologies as well as providing a valuable theoretical link between psychoanalytic theories of ego-formation and the more empirically-based traditions of developmental psychology.

Appendix 1: EKMAN AND FRIESEN'S (1975)
DESCRIPTIONS OF SIX PRIMARY FACIAL EXPRESSIONS

1. Surprise: distinctive clues

"-The brows are raised, so that they are curved and high.

-The skin below the brow is stretched.

-Horizontal wrinkles go across the forehead.

-The eyelids are opened; the upper lid is raised and the lower lid drawn down; the white of the eye (the sclera) shows above the iris, and often below as well.

-The jaw drops open so that the lips and teeth are parted, but there is no tension or stretching of the mouth."

2. Fear: distinctive clues

"-The brows are raised and drawn together.

-The wrinkles in the forehead are in the center, not across the entire forehead.

-The upper eyelid is raised, exposing sclera, and the lower eyelid is tensed and drawn up.

-The mouth is open and the lips are either tensed slightly and drawn back or stretched and drawn back."

3. Disgust: distinctive clues

"-The upper lip is raised.

-The lower lip is also raised and pushed up to the upper lip, or is lowered and slightly protruding.

-The nose is wrinkled.

-The cheeks are raised.

-Lines show below the lower lid, and the lid is pushed up but not tense.

-The brow is lowered, lowering the upper lid."

4. Anger: distinctive clues

- "-The brows are lowered and drawn together.
- Vertical lines appear between the brows.
- The lower lid is tensed and may or may not be raised.
- The upper lid is tensed and may or may not be lowered by the action of the brow.
- The eyes have a hard stare and may have a bulging appearance.
- The lips are in either of two basic positions: pressed firmly together, with the corners straight or down; or open, tensed in a squarish shape as if shouting.
- The nostrils may be dilated, but this is not essential to the anger facial expression and may also occur in sadness.
- There is ambiguity unless anger is registered in all three facial areas."

5. Happiness: distinctive clues

- "-Corners of lips are drawn back and up.
- The mouth may or may not be parted, with teeth exposed or not.
- A wrinkle (the naso-labial fold) runs down from the nose to the outer edge beyond the lip corners.
- The cheeks are raised.
- The lower eyelid shows wrinkles below it, and may be raised but not tense.
- Crow's-feet wrinkles go outward from the outer corners of the eyes."

6. Sadness: distinctive clues

- "-The inner corners of the eyebrows are drawn up.
- The skin below the eyebrows is triangulated with the inner corner up.
- The upper eyelid inner corner is raised.
- The corners of the lips are down or the lip is trembling."

For further details see Ekman and Friesen (1975 1978).

Appendix 2: SAMPLES OF DESCRIPTIONS USED IN
THE EXPERIMENTS REPORTED IN CHAPTER 5

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1. The baby is playfully greeted by her mother ~~and she responds by crying.~~
2. The baby behaves as if she were trying to speak.
3. The baby, who has been talking contentedly with her mother, is suddenly ignored by her and feels hurt and rejected.
4. The baby, who feels she has been rejected by her mother, rejects her mother in return.
5. The baby, who has been feeling out of the conversation, is suddenly playfully teased by her mother and this pleases her.
6. The baby, who is talking to her mother, becomes puzzled by her mother's exaggerated reaction to her.
7. The baby, who has been feeling confused, suddenly gets re-involved in the conversation.

(E)

(D)

(B)

(F)

(C)

(G)

(A)

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Middleton.

LANCHESTER POLYTECHNIC

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1. The mother greets her baby with a little joke.
2. The mother listens with attention and restrained amusement to her baby - as if the baby were telling her something.
3. The mother who has been conversing animatedly with her baby, suddenly turns away to talk to someone else.
4. The mother returns to the conversation but without any real interest.
5. The mother suddenly teases her baby.
6. The mother makes an exaggerated response to her baby, as if over-keen to be interested in what the baby is saying.
7. The mother leads the conversation on to a new topic.

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Ben Swinester-Bradley

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✓ (E)
(F)
(D)
✓ (C)
✓ (B)
(G)
(A)

Appendix 3: COPY OF A PAPER
BY SYLVESTER-BRADLEY AND TREVARTHEN (1978)

"Babytalk as an Adaptation to the Infant's
Communication"

published in N. Waterson and C. Snow (Eds.)
The Development of Communication, London:
Wiley; pp.75-92

Plate 1 is Photos. 127-138.

This paper is a discussion of filmed and videotaped taken of one baby girl, Sarah, between the ages of 8 and 20 weeks, with her Caucasian, primiparous, middle-class mother. At approximately weekly intervals the mother visited our laboratory where she was asked to chat with Sarah while we filmed from an other room. Twelve sessions yielded, on average, 4 minutes 37 seconds of film (see Trevarthen 1977, for procedural details).

With this small corpus of data we wish to illustrate the necessary preconditions for discussing a mother's baby talk as an adaptation to her infant's communication. Two subsidiary issues are involved: first, the ways in which the mother's baby talk changes in relation to her infant's behaviour, and secondly, in what sense these changes constitute adaptations to a growing communication.

*This research was supported by an M.A.C. Studentship and S.S.R.C. Grant No. 1163 'Prospeech in Communication of Infants with Adults'.

Baby Talk as an Adaptation to the Infant's Communication

B. Sylvester - Bradley and C. Trevarthen

This paper is a discussion of films and video-tapes taken of one baby girl, Sarah, between the ages of 8 and 20 weeks, with her caucasian, primiparous, middle-class mother. At approximately weekly intervals the mother visited our laboratory where she was asked to chat with Sarah while we filmed from another room. Twelve sessions yielded, on average, 4 minutes 39 seconds of film (see Trevarthen 1977, for procedural details).

With this small corpus of data we wish to illustrate the necessary preconditions for discussing a mother's baby talk as an adaptation to her infant's communication. Two subsidiary issues are involved: first, the ways in which the mother's baby talk changes in relation to her infant's behaviour, and secondly, in what sense these changes constitute adaptations to a growing communication.

*This research was supported by an M.R.C. Studentship and S.S.R.C. Grant No.HR 2263 'Prespeech in Communication of Infants with Adults'.

CHANGES OF BABY TALK IN RELATION TO THE INFANT'S BEHAVIOUR

We observed striking changes in both Sarah's behaviour and her mother's baby talk. In the first few weeks of the study both mother and child interacted with animation, Sarah displaying many of the behaviours we associate with sociability (e.g., smiling and eye-contact). By 14 weeks, however, the mother-infant interaction no longer seemed so successful. As noted in some other studies (e.g., Polak, Emde and Spitz, 1964), there was a marked decline in the proportion of each session for which Sarah would look positively (without crying) at her mother, and there was also a marked decline in the proportion of time Sarah spent smiling (see Figure 1). However, as in Ambrose's (1963) study, these drops in our indicators of interactional success were followed at around 17 weeks by second peaks. (N.B. These indicators are not homogeneous. For example, the final decline in eye-contact to the level found at 18, 19 and 20 weeks, differs from the first decline at 12, 13 and 14 weeks in that it represents less Sarah's purely looking away from her mother, e.g., just to stare at the floor, the ceiling or her hands, than looking away to examine the rest of the room.)

Here we have a conspicuous change in Sarah's behaviour, and it is clear in our analysis that her mother's baby talk showed a concurrent change. Although we do not want to claim any direct causal relations between the indices we happen to have measured, it is true to say that, as Sarah began to grow less sociable, there was an increase in the verbal density of her mother's baby talk (syllables/sec. of Standard English), and, furthermore, it was only when the baby talk showed a definite decrease in density that Sarah's positive regard and smiling recovered. These changes in verbal density were also associated with an overall increase in the proportion of utterances which were contentless.

Our use of the terms 'verbal', 'non-verbal' and 'contentless' is as follows. An utterance is deemed verbal if it is made up of Standard English words, otherwise it is deemed non-verbal. An utterance is registered as contentless when the verbal information it might convey is subordinated to the effect of its constituent physical sounds. Thus non-verbal utterances, such as imitations of Sarah's babbles, are automatically contentless, but verbal utterances are only contentless when their stressing and intonation undergo a marked alteration, as in verses, chants or songs (cf. Snow, 1975). This means that the approximately inverse relationship between changes in verbal density and changes in the proportion per session of contentless utterances shown in Figure 2 is by no means a necessary artefact of our method. The level of verbal

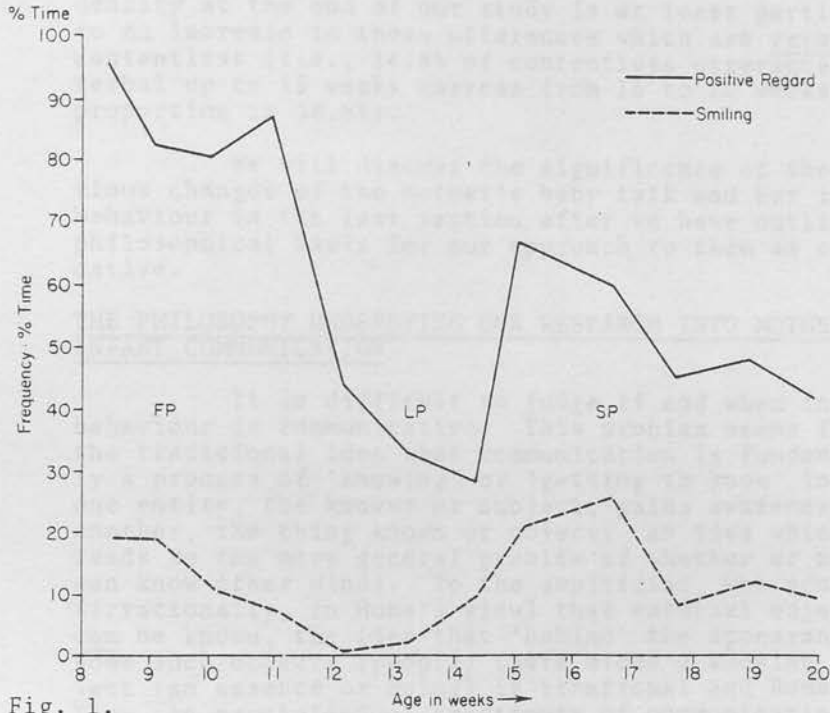


Fig. 1.

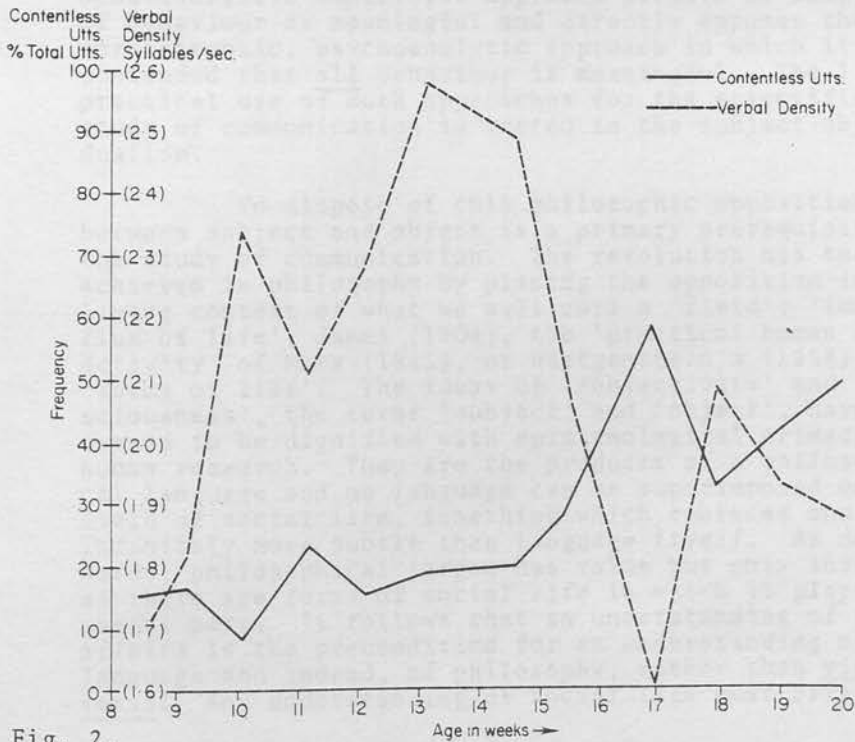


Fig. 2.

density at the end of our study is at least partly due to an increase in those utterances which are verbal but contentless (i.e., 14.8% of contentless utterances are verbal up to 15 weeks whereas from 16 to 20 weeks, the proportion is 38.6%).

We will discuss the significance of these various changes of the mother's baby talk and her infant's behaviour in the last section, after we have outlined the philosophical basis for our approach to them as communicative.

THE PHILOSOPHY UNDERLYING OUR RESEARCH INTO MOTHER-INFANT COMMUNICATION

It is difficult to judge if and when infant behaviour is communicative. This problem stems from the traditional idea that communication is fundamentally a process of 'knowing' or 'getting to know' in which one entity, the knower or subject, gains awareness of another, the thing known or object; an idea which leads to the more general problem of whether or not we can know other minds. To the empiricist, who accepts (irrationally, in Hume's view) that external objects can be known, the idea that 'behind' the appearance of some such objects (people) there hides a knowing subject (an essence or Being) is irrational and Romantic. Thus, in psychological treatments of communication, the behaviouristic empiricist approach permits no analysis of behaviour as meaningful and directly opposes the more Romantic, psychoanalytic approach in which it is contended that all behaviour is meaningful. The limited practical use of both approaches for the scientific study of communication is rooted in the subject-object dualism.

To dispose of this philosophic opposition between subject and object is a primary prerequisite for the study of communication. The resolution has been achieved in philosophy by placing the opposition in the living context of what we will call a 'field': 'immediate flux of life', James (1904), the 'practical human sense activity' of Marx (1845), or Wittgenstein's (1958) 'forms of life'. The ideas of 'subjectivity' and 'consciousness', the terms 'subject' and 'object', have ceased to be dignified with epistemological primacy in human research. They are the products of a philosophical language and no language can be superimposed on the field of social life, something which embraces and is infinitely more subtle than language itself. As do all words, philosophical jargon has value but only insofar as there are forms of social life in which it plays a useful part. It follows that an understanding of social affairs is the precondition for an understanding of language and indeed, of philosophy, rather than vice versa! Any understanding of social life must originate

in a knowledge of other minds which is taken for granted as inherent in the society of men. Thus, any student of social affairs must acknowledge from the start, both a priori, methodologically and in fact, observationally, that man is endowed with an intuitive understanding of his fellows. The main problem facing us in this approach to the study of social behaviour is the status of the individual. If we argue, with Macmurray (1961), that the original form of knowledge is knowledge of others, how can we come to know ourselves? As Nietzsche concludes, this is the question we are least able to answer ('Jeder ist sich selber der Fernste', Nietzsche, 1887, sect. 335).

What we are saying is that the sense of 'communication' will be discovered in terms of the nature and articulation of what now appears as a field of social forms. The investigation of this field is difficult because of the investigator's participation in it - implicating him in polarizing the field, however hard he does or does not try to detach himself as an observer. Thus, to analyse social relations as if they were divided from oneself is to adopt an uncritical position. But as yet, no way has been found to analyze them usefully as a part of one's personal life. This difficulty dogs the study of mothers and infants even where it is least apparent. For illustration, we will examine the 'pragmatic' approach to the study of mother-infant communication taken by those psychologists who accept the philosophy of, among others, Peirce, James, Dewey, Mead, Searle and Grice (e.g., Bruner, 1975; Shotter, 1975).

As an example we will take one of Grice's (1957) criteria for meaningful communication, that 'the speaker must intend to produce a certain effect in his listener'. This criterion poses the problem of establishing the infant's intention. For instance, Sarah's mother often commented on her daughter's behaviour around 14 weeks as if it were a rejection (e.g., Are you just gonna ignore me?, You've got the pip with me, haven't you?) which was directed specifically at her (e.g., It's just me you don't want to talk to, isn't it?), particularly as the decrease in Sarah's sociability was less noticeable when she was with other adults (cf. Fitzgerald, 1968; and Caldwell, 1965, in Schaffer, 1971, who found similar strange preferences at 3 months). But did Sarah intend to reject her mother? We cannot ask her as we would ask an adult, and to posit a non-verbal procedure for the verification of intention is to accept that actions embody intentions in the absence of any conscious acknowledgment, a position akin to Freud's notion of 'unconscious ideas' and subject to the problems of Roman-ticism (see below).

Nevertheless, Bruner (1975) in his paper 'The Ontogenesis of Speech Acts', outlines just this sort of procedure. He asserts that intentional behaviour has measurable features which can be used for 'inferring that children "have" intentions'; for example, 'anticipation of an outcome of an act', 'a stop-order defined by an end-state', 'appropriate means for the achievement of an end-state', and so on. In this vein, we might argue that, because Sarah's rejection was active (she would refuse her mother's attentions despite her mother's repeated attempts to re-establish contact, e.g., calling out Hello!, Sarah!, etc., putting her head in Sarah's line of regard, and even tugging Sarah's head round to face her), it was intended. But such a designation of the 'end-state' of Sarah's behaviour as a rejection must still ultimately depend on the more or less covert assumption of an ideal form of communication within which some logic of human relationship is supposedly working, a form conceptualized in psychoanalysis, for instance, as culminating in the 'prise de conscience' or 'passage into the Full Word' (Lacan, 1956).

If the analysis were to stop at this point, with the use of criteria, its conclusions would at best be condemned to relativity; they would be less the product of real discoveries in the field of social relations than of some position, political, moralistic or religious, which had been adopted by the investigator. For example, Shotter concludes, near the beginning of his article on mother-infant interaction (1975), that the goal of personal development (and therefore developmental psychology) is 'to act deliberately rather than spontaneously'. To adopt this kind of dogmatic position is to reinstitute the dualism between the appearance and the underlying 'essence' of development, dividing the analyst as by divine right from his subjects. Indeed, it is to assume psychological knowledge which we do not have and of a type we would be mistaken to seek.

The weakness of the pragmatic analysis of communication lies in its ignorance of origin: on the one hand, the psychological origins of communication (e.g., of the illocutionary force), and on the other, the origins of the analyst's position vis-à-vis his investigation (i.e., his view of social relations). Either way a consideration of origins leads back to the field of social relations. For the truth of the investigation depends first, on the psychological processes which allow the investigator to make real discoveries in his involvement with others as a natural, historical individual, and secondly, on the possibility of representing those discoveries in a language which others can understand and, as a corollary, in whose terms he can comprehend his own

position in the field of human relations. What saves such discoveries from relativism is that they are a product of the investigator's personal life, which is for him absolute. The individuality expressed in a finding about humans is to the researcher a gain in self-knowledge, to others it is his originality. That knowledge about our fellows can only be gained within a personal context is thus not a drawback to social research, but its precondition and its only true worth. This personal approach is therefore essential to any research into human relations, the vexing difficulty of which should not be glossed over.

Our research into communication between mother and infant must begin with the delineation and description of the social forms in which we perceive them to participate: it is in terms of the nature and articulation of these forms that we will come to understand the psychological processes underlying mother-infant communication. That is why we emphasize a descriptive approach (Trevvarthen, 1977).

Our argument that Sarah takes part in social forms of life runs as follows. The majority of English speakers distinguish certain patterns of life as 'social' (e.g., arguing, chatting, joking) and these patterns incorporate certain behaviours. In analysing our films of Sarah supposedly chatting with her mother, we recorded many of the social behaviours accepted as important in 'chatting' between adults (often in diverse cultures, see, e.g., Eibl-Eibesfeldt, 1970; Ekman, 1973): facial expressions such as smiling, frowning, and surprise, vocalizations, crying, laughing, patterned eye-contact, spontaneous and reciprocal eye-brow flashing, gesture-like arm-movements and some speech-like lip and tongue-movements (see Trevvarthen, 1977), imitation of and a degree of bodily synchrony with the mother (see Plate 1). Moreover, we found that Sarah showed these behaviours specifically in the context of 'chatting'; the frequency of these behaviours while chatting was much greater than their frequency while attempting to grasp a suspended wooden ball (e.g., at 9 weeks the chatting : reaching ratios were % regard 81 : 85, number of eyebrow flashes 17 : 5, number of tongue protrusions 61 : 8, number of mouth openings 51 : 16, number of vocalizations 6 : 0, number of frowns 8 : 0, number of smiles 16 : 0, see Sylvester-Bradley, in preparation). Sarah exhibited not only social behaviours but also a basic distinction between social and asocial contexts. We conclude that this distinction is of great psychological significance and in this cannot agree with many statements to the contrary in the developmental literature (e.g., Schaffer, 1971: 1, 31). Trevvarthen (1976, 1977) incorporates the idea of an inherent aptitude for perceiving persons as partners in communication and for

expressing communicatively, into the term 'intersubjectivity' which both describes the nature of communication and presumably reflects some specific but unknown structure of the brain, with which the infant is born.

We will now proceed with a more detailed discussion of those changes in Sarah's behaviour and her mother's baby talk outlined above in terms of a description of the social patterns in which Sarah and her mother took part. In this way we hope to establish not so much the presence or absence of their communication as the forms in which it is constituted.

FORMS OF ADAPTATION

Conversational Form. Baby talk is social behaviour and social behaviour must involve mutual adaptation at some level of description. At the most superficial level, baby talk sounds like half a conversation (Snow, 1975). And further, if one describes the interchange as a conversation, one finds that the mother's baby talk adapts to the infant's acts. For example, subtle movements of Sarah's head, although often ignored, are often picked up as formal contributions to a conversation. At eight weeks, three slight, alternating head-movements by Sarah produced an emphatic head-shake in her mother accompanied by an abrupt change from a succession of positive statements and questions to a negative statement: You're looking very pensive, aren't you? You're looking very pensive. Mmm. What are you doing? (Sarah's head moves laterally.) You don't want to smile (with emphatic head-shake). No. etc. The mother, in treating Sarah's behaviour as communicative, lends this episode the form of conversational turn-taking. But to say that the mother is holding a conversation with Sarah is in fact absurd: the interaction may be conversational but it is not a conversation. In the first place, there is no exchange of ideas, and secondly, even adult conversation cannot be adequately characterized by a simple transcription of what is spoken. An analysis of baby talk as a conversation is misplaced because it exaggerates the baby's conscious achievement and it totally neglects baby talk's intersubjective origins.

At another level, a primary origin of mother-child interaction is the mother's responsibility for satisfying her child's physiological needs. This responsibility, however, is not obviously reflected in our mother's baby talk. She did not assume dominance, scarcely referring to herself at all (only 9.0% of all pronominal subjects were 'I'; 76.8% were 'you'; and only 2.7% of all her utterances referred to her own feelings or intentions and these were often playful,

e.g., 'I'll bite your little hand off; 23.5% referred to the infant's psychical state). Neither did she exercise much authority; only 2.9% of her utterances were imperative and these too were often playful (e.g., You let me go! when Sarah was holding her hair). Thus in the main, baby talk is not an accompaniment to the management of physiological needs. These needs may be mentioned (e.g., You a bit hot, eh?, or You wanna drink?) but only amongst all the other varied references to Sarah, her body, her clothes and her general psychical state, which make up 84.3% of all the references in our corpus of baby talk. The mother appears to be playing a passive, receptive role in which she continually interprets back to Sarah Sarah's immediate state, her moods (e.g., You're giving me the cold shoulder), her facial expressions (e.g., You're not looking very happy), and her actions (e.g., You've got your hand in the air) as they happen. Thus, in the first two weeks of our study, 83.8% of all verbs used were in the present tense (overall proportion: 69.8%). In these early sessions this receptive role was particularly apparent. We wish to distinguish it as the defining characteristic of a social form we will call 'mirroring'.

Mirroring. Mirroring is a strategy used in psychotherapy (see, for example, the transcriptions in Axline, 1947) which is particularly useful in early stages of treatment for establishing the therapist's emotional understanding of a patient, and also for developing the patient's consciousness of his own actions. It is a strategy demanding an attitude of mind which Freud (1912) described as the 'fundamental rule of psychoanalysis', namely, that the analyst 'must adjust himself to the patient as a telephone receiver is adjusted to the transmitting microphone ... so (his) unconscious is able, from the derivatives of the unconscious which are communicated to him, to reconstruct that unconscious, which has determined the patient's free associations' (cf. the infant's actions). This is an excellent description of the attitude of mind evinced by the mother, who appears in the role of an unconsciously skilled analyst. Furthermore, it is clear that the mother has a symbolic key or programme of categories for experience (as does the analyst: he uses the 'Freudian' or 'Jungian' system), a key which is partly idiosyncratic and partly cultural and which leads to a very selective construction of her baby's actions. This key operates obviously in the verbal sphere (in the adjectives used, e.g., 'grumpy', 'cheeky', 'pensive'), but also programmes the non-verbal sphere of the interaction (as the movement mirrored as a 'head-shake' for 'No' reported above, p. 84.

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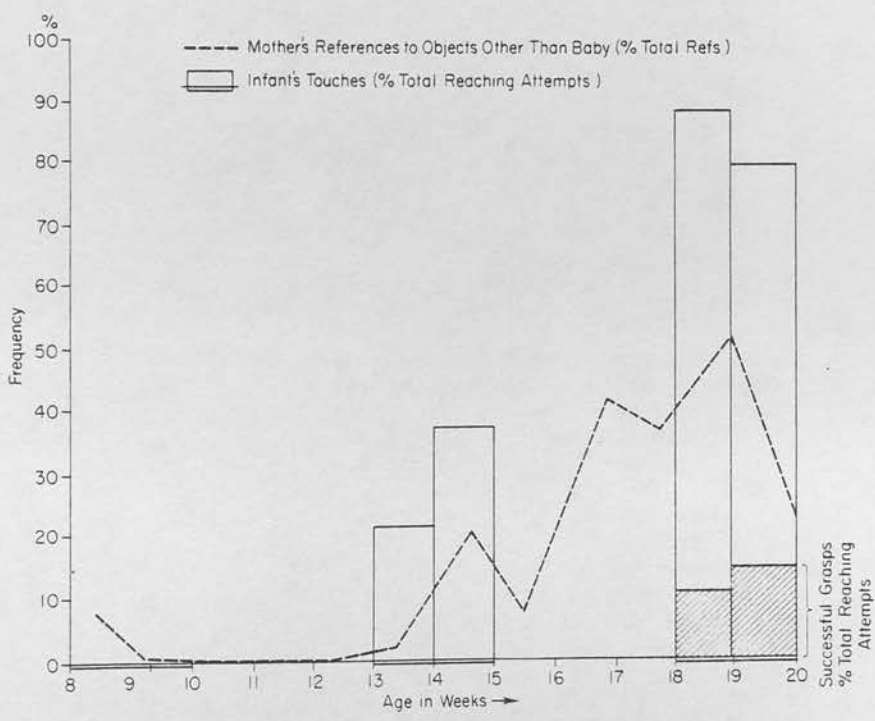


Fig. 3.

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Although a mother's mirroring may just sound as if she is talking to herself it is not a wholly verbal activity, in fact verbal mirroring appears to be sometimes a substitute for and sometimes a projection of a non-verbal interactive process into the verbal sphere. As far as the infant can recognize her own actions in the mirroring of her mother (and this ability would be no more than a reorganization of the imitative process which Sarah sometimes demonstrates, see Plate 1; cf. Maratos, 1973) it is the non-verbal modes of mirroring which must be primary. These modes are both visual (see Plate 1) and vocal. Thus for example, a cry may be mirrored concurrently by the mother in terms of amplitude, intonation and phrasing; it might also be repeated after Sarah had stopped crying. The spheres of verbal and non-verbal mirroring may thus unite, a verbal interpretation being delivered in the form of the non-verbal sound it is mirroring (e.g., the mother says You're crying!; mirroring the cry in terms of amplitude and pitch). However, non-verbal and verbal mirroring do not always harmonize; they may conflict. For example, a long sequence of visually mirrored mouth movements (see Plate 1) finished abruptly when one of Sarah's movements was interpreted verbally as a yawn (i.e. Howowowowo (non-verbal mirroring of Sarah's mouth movements which culminate with a pseudo-yawn) Tt! Are you very bored?).

As Sarah grows older, her mother mirrors different things. In fact, mirroring is a social form ideally suited to incorporate the infant's changes of interest and development of ability. For example, Sarah's ability to touch and grasp objects showed a marked improvement during the study (Figure 3). This new ability and the associated interest in the outside world is reflected in the mother's baby talk by a large overall increase in the proportion of references to bodies other than Sarah's (i.e., her clothes, her mother, her toys and other objects around the room, see Figure 3b). Thus mirroring remains an important pattern throughout the study and indeed into adulthood when speakers and listeners often complete each other's unfinished sentences, demonstrating the degree of their mutual understanding (see, for example, Ferguson, 1975, on 'silent interruptions' and 'predictive monitoring').

It is in terms of what 'mirroring' offers to the infant that we may begin to understand the changes outlined in the second section of this paper. These changes lead the communication to other forms of interaction. It is clear that the mother is concerned at Sarah's increasingly antisocial behaviour at three months (see her comments, page 79). Her response to this behaviour is first to mirror it verbally (e.g., You're telling me off, aren't you? You're not gonna have a chat today. Are you bored with Mummy; talk

all the time). Thus the correlation between the rise in verbal density of baby talk and the fall in Sarah's sociability can be seen as a part of the social form of mirroring. However, the recovery in Sarah's positive regard and smiling seems to be associated with a decrease rather than this increase in verbal density (cf. Figures 1 and 2). We contend that this decrease reflects the rising importance of an alternative social form to mirroring, best exemplified in games.

Playful Form. The rise of the game-playing is indicated by the overall increase of contentless utterances in baby talk (see Figure 2a). Although this increase partly reflects the increasing number of Sarah's vocalizations - because vocalizations are usually imitated - one major contribution to it is the increasing number of rhythmically repeated verbal utterances (see page 78) for example, You're gonna play a game with me - you're goin to play a game. Goin to play a game. Goin to play a game. Hey! Hey! Hey! Goin to play a game. In chanting and dancing games like this, in their rhythm and music, the verbal and non-verbal spheres are integrated in a new way. Games have a regular structure which lasts several seconds, and this structure is always accentuated vocally by the mother, and often by the baby too. Thus, a phase of action, which often has its own vocally stressed beat (e.g., butting Sarah in the stomach, worrying her fingers) is inevitably followed by a pause during which the mother looks at her baby and smiles, laughs or calls out. If the baby expresses enjoyment at this point, by happy animation or a call, the game will be renewed, often in a slightly altered form.

We believe that this playful social form differs from mirroring in that it requires the mutual understanding and confidence which mirroring is adapted to foster. Mirroring is receptive while play is more assertive; thus, borrowing from Grice's terminology in the citation above, we would say that early on, the mother was developing her comprehension of the various 'effects' Sarah 'intended' to produce in her, passively letting her have her say, while in the later stage, the mother has gauged Sarah and can thus more actively have a say too. To do so, she has had to change her language into a form more compatible with Sarah's embryonic understanding and expectations. Thus, by the end of our study, the interaction between Sarah and her mother seemed as successful as at the beginning but in a different way and at a higher plane of complexity. Not only had Sarah's abilities and interests grown and changed, objects becoming more important, but the emergence of the playful form of social interaction had involved transformation of Sarah's social behaviours as well as her mother's baby talk.

In summary, we see the most fruitful way of understanding the complex variations in Sarah's behaviour from 8 to 20 weeks and in her mother's baby talk to be as manifestations of a developing relationship. The growth of joint enterprise fostered in the forms of mirroring and play would seem to prepare naturally for more complex enterprises later, in which the growth of Sarah's understanding, both of people and of things, will take place in a predominantly social world.

CONCLUSION

In this paper we have discussed baby talk as part and illustration of the mutual interactive adaptation between mother and child. 'Adaptation' is here less a biological than a psychological term: an infant's rejection of its mother would be strictly maladaptive in evolutionary terms were it not taking place within a psychological realm with its own systems of control and laws of growth. In our terms, an adaptation is a social form in which both mother and child share through their inherent similarities. Such similarities are not only the basis of mother-child interaction but also of the investigator's understanding of their communication. Although this shared core at the heart of each social form may vary in the complexity and content of its expression, it persists through life: while knowledge develops, the fundamental forms of sociability stay the same. For example, the onset of language is a cognitive milestone with enormous consequences in the pragmatics of communication, but is it an interactive milestone? We think our work shows that it is not. Sarah's linguistic skills will be employed within pre-existing forms of interaction just as was her new interest and ability with objects.

Although the main form stays the same, the student of interactive development is faced with a process of change. We must withstand the temptation to call this change progress because the formulation of development as progress destroys any curiosity for the actual nature of change. For this reason we have not considered the development we observed as a necessary progression of social forms; those forms were observed to a lesser or greater extent throughout our study and will continue to recur (see Trevarthen, 1976, for further discussion). A child does not disregard her mother for the last time at the age of fifteen weeks! Neither were the changes we recorded unidirectional. But then, in our view, social change does not gain sense from its place in a chronological progression but from the position of the individual concerned within the field of social relations at the time of change and the investigator's perception of that position.

What we have tried to demonstrate in this paper is less a theory of social development than a necessary orientation to our subject-matter. Thus, if our approach appears tautologous because we assume sociability in studying the baby, it is with good reason; because, as Samuel Beckett has remarked a tautology is the expression of a relation. The practical value of that relation, as the tautologous theory of biological evolution by 'survival of the fittest' shows, is the opening of new fields of description to procedures of scientific verification. The aim of our argument then has been to illustrate the necessity and productivity of describing baby talk as an adaptation to the infant's communication within the field of social relations.

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Appendix 4: SUPPLEMENTARY TABLES
TO CHAPTER 6

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Appendix 4: SUPPLEMENTARY TABLES
TO CHAPTER 6

Key: D = Duration of Condition (seconds); L = Amount of Looking (seconds);
% = L as a percentage of D.

TABLES A4/1-5: Amount of Looking in each condition for each baby in each session during the study

TABLE A4/1: JOANNA

AGE (weeks)	CONDITIONS														
	Mother			Stranger			Familiar Mask			Unfamiliar Mask			Total Session		
	D	L	%	D	L	%	D	L	%	D	L	%	D	L	%
6	273.8	5.5	2.0	282.9	42.1	14.9	84.5	0.0	0.0				641.1	47.5	7.41
8	272.0	237.0	87.1	217.5	205.3	94.4	124.1	61.6	49.7				613.5	503.9	82.1
10	290.4	236.5	81.5	338.6	333.4	98.5	268.6	228.8	85.2	146.5	120.7	82.4	1044.1	1919.3	88.1
12	276.3	115.0	41.6	305.0	215.9	70.8	262.6	201.9	76.9	291.6	229.8	78.8	1135.3	762.5	67.2
14	96.9	81.1	83.7				289.7	212.0	73.2				386.6	293.1	75.8
15	323.1	220.3	68.2	340.9	170.7	50.1	69.4	54.3	78.2	206.1	136.1	66.0	939.4	581.3	61.9
16	327.5	226.5	69.2	334.4	59.6	17.8	350.9	138.5	39.5	286.5	135.5	47.3	1299.3	560.0	43.1
18	313.7	254.5	81.1	160.7	130.2	81.0	301.5	252.9	83.9	350.1	206.8	59.1	1126.0	844.3	75.0
21	92.0	19.2	20.9	220.4	155.9	70.7	222.4	126.5	26.9	266.8	166.1	62.3	801.6	467.7	58.4
23	253.7	93.3	36.8	280.1	198.6	70.9	358.0	160.2	44.8	271.5	85.1	31.3	1163.3	537.1	46.2
26	372.7	58.0	15.6	287.3	47.1	16.4	292.5	159.1	54.4	309.8	78.7	25.4	1262.2	342.9	27.2

Key: D = Duration of Condition (seconds); L = Amount of Looking (seconds);
% = L as a percentage of D.

TABLE A4/2: ANGELA

AGE (weeks)	CONDITIONS													
	Mother		Stranger		Familiar Mask		Unfamiliar Mask		Total Session					
	D	L	%	D	L	%	D	L	%	D	L	%	D	L
7	200.8	112.2		214.6	129.0	60.1	319.7	225.1	70.4	240.5	151.5	63.0	774.8	505.6
8	275.8	258.3	93.7	251.3	215.1	85.6	230.5	127.7	55.4	203.7	186.5	91.6	961.3	787.6
10	380.7	341.7	89.8	268.8	231.9	86.3	300.0	120.0	60.0	343.3	135.3	39.4	1292.6	828.9
14	274.2	164.1	59.9	324.8	270.4	83.3	283.9	164.2	57.8	298.7	260.8	87.3	1181.6	859.5
16	306.8	60.0	19.6	275.2	140.8	51.2	303.8	125.4	41.3	351.0	47.4	13.5	1236.8	373.6
17	283.6	139.4	49.2	399.0	193.3	48.4	301.8	189.7	62.9	292.3	170.7	58.4	1276.7	693.1
19	396.3	36.4	9.1	291.5	242.3	83.1	275.1	135.2	49.2	245.3	95.0	38.7	1208.2	508.9
23	288.0	17.2	6.0	280.2	93.8	33.5	295.4	84.1	28.5	346.9	91.0	26.2	1210.5	286.1
24	232.2	23.0	9.9	377.2	166.1	44.0	196.0	75.9	32.7	270.2	58.3	21.6	1075.6	323.3
26	325.0	33.2	10.2	276.7	106.1	38.6	228.5	79.6	34.8	311.1	106.2	34.1	1141.3	325.1

Key: D = Duration of Condition (seconds); L = Amount of Looking (seconds);
% = L as a percentage of D.

TABLE A4/3: LEIGH

AGE (weeks)	CONDITIONS											
	Mother		Stranger		Familiar Mask		Unfamiliar Mask		Total Session			
	D	L %	D	L %	D	L %	D	L %	D	L %	D	L %
6	266.4	112.2 42.2	163.7	117.0 71.5	123.5	87.4 70.8	100.7	80.9 80.3	654.3	397.5 60.8		
7	53.1	44.2 83.2			15.0	0.0 0.0			68.1	44.2 64.9		
8	311.3	215.7 69.3			145.7	134.3 92.2			457.1	350.0 76.6		
11	87.1	55.4 63.6	294.3	156.0 53.0			272.8	163.5 59.9	654.2	374.9 57.3		
16	333.4	78.9 23.7	306.1	204.7 66.9	288.5	169.9 58.9	349.3	148.6 42.6	1277.3	602.1 47.1		
18	149.2	69.3 46.4	218.6	136.5 62.5	277.0	113.7 41.0	183.7	21.6 11.8	828.5	341.1 41.2		
20	272.0	73.3 25.0	331.2	69.8 21.1	278.1	138.0 49.6	49.6	33.8 68.0	930.9	314.9 33.8		
22	346.5	126.8 36.6	266.5	154.1 57.8	185.4	61.2 17.8	184.5	74.4 40.3	983.0	416.5 42.4		
23	300.7	42.7 14.2	369.4	68.0 18.4	282.3	90.4 32.0	184.2	31.8 17.3	1136.6	232.9 20.5		
24	272.7	66.7 24.5	297.0	164.0 55.2	102.1	27.1 26.6	213.2	53.5 25.1	885.0	311.3 35.2		

Key: D = Duration of Condition (seconds); L = Amount of Looking (seconds);
% = L as a percentage of D.

TABLE A4/4: JAKILENE

AGE (weeks)	CONDITIONS													
	Mother		Stranger		Familiar Mask		Unfamiliar Mask		Total Session					
	D	L	%	D	L	%	D	L	%	D	L	%	D	L
6	212.2	90.3	42.6	243.3	159.3	65.5	167.1	45.5	27.2	154.7	95.1	61.5	777.2	390.1
9	307.5	283.1	92.1	308.2	175.2	56.8	305.2	258.8	84.8	204.8	133.6	65.2	1125.7	850.7
15	339.4	86.5	25.5	257.0	122.1	45.5	200.5	150.4	75.0	162.7	97.1	59.7	959.5	456.2
17	264.3	17.2	6.5	276.0	193.5	70.1	294.4	187.2	63.6	132.3	64.7	48.9	967.0	462.6
18	309.1	154.6	50.0	339.5	194.7	57.3	44.3	8.8	19.9	273.6	100.6	36.8	966.6	458.7
19	240.7	31.8	13.2	249.3	40.5	16.2	144.7	113.0	78.1	69.7	51.6	73.9	704.4	236.8
21	298.8	78.3	26.2	306.8	85.6	27.9	125.6	86.1	68.6	234.6	139.2	59.3	965.8	389.1
22	266.2	32.1	12.0	281.3	63.8	22.7	49.8	25.8	51.8	257.6	121.2	47.1	854.9	242.9
23	336.6	36.3	10.8	337.1	150.9	44.8	277.1	85.3	30.8	341.8	82.8	24.2	1292.6	355.2
25	347.1	24.7	7.1	298.3	131.8	44.2	263.1	36.6	13.9	314.9	69.1	21.9	1223.4	262.1

Key: D = Duration of Condition (seconds); L = Amount of Looking (seconds);
% = L as a percentage of D.

TABLE A4/5: JULIE

AGE (weeks)	CONDITIONS													
	Mother			Stranger			Familiar Mask			Unfamiliar Mask			Total Session	
	D	L	%	D	L	%	D	L	%	D	L	%	D	L
10	174.9	152.4	87.1	178.9	140.9	78.8	174.2	124.8	71.7	140.8	97.2	69.0	668.8	515.3
12	289.3	135.9	47.0	246.1	128.4	52.2	190.0	76.0	40.0	213.2	205.7	96.5	938.6	546.0
13	148.8	71.1	47.8	281.6	229.1	81.4	258.1	126.2	49.2	110.5	19.1	17.3	799.0	445.5
16	303.6	40.6	13.4	300.6	196.0	65.2	218.1	97.7	44.8	123.0	30.2	24.5	945.3	364.4
17	327.9	81.2	24.8	364.0	87.6	24.1	305.6	141.8	46.4	240.8	134.2	55.7	1238.2	444.8
21	298.1	151.5	72.0	308.0	146.9	47.7	247.2	117.2	47.4	47.6	2.1	4.4	900.9	417.7
23	266.7	155.7	58.4	222.6	140.7	63.2	200.6	61.5	30.6	268.8	98.1	36.5	958.8	456.0
25	305.9	211.4	69.1	282.1	141.4	50.1	173.1	26.8	15.5	103.1	34.9	33.9	864.2	414.6
28	301.7	126.7	42.0				101.0	15.0	14.9				402.7	141.7

Key: D = Duration of Condition (seconds); L = Amount of Looking (seconds);
% = L as a percentage of D.

Key: $Z(A) = \%$ of first one hundred seconds; $Z(B) = \%$ of total interaction;
asterisks mark sessions which lasted less than 100 seconds in total.

TABLE A4/6: Proportion of visual fixation (%) during the first one hundred seconds of interactions between each baby and her mother compared with the proportion of visual fixation (%) for the whole interaction

Session	JOANNA		ANGELA		LEIGH		JAKILENE		JULIE	
	%(A)	%(B)	%(A)	%(B)	%(A)	%(B)	%(A)	%(B)	%(A)	%(B)
1	5.47	2.00	98.78	93.66	56.91	42.18	52.85	42.56	86.37	87.14
2	78.73	87.13	89.12	89.76	*	83.24	88.38	92.08	58.79	46.97
3	78.12	81.45	56.80	59.85	57.42	69.27	38.96	25.45	39.54	47.76
4	33.63	41.59	53.00	19.56	*	63.61	6.96	6.50	22.01	13.36
5	*	83.73	56.40	49.15	43.70	23.67	60.12	50.01	42.90	24.76
6	59.68	68.16	8.80	9.09	51.18	46.40	15.25	13.21	83.53	71.97
7	48.88	69.17	4.50	5.97	4.33	24.95	29.19	26.18	78.27	58.38
8	61.50	81.13	10.60	9.91	42.04	36.60	11.79	12.04	56.08	69.11
9	*	20.87	7.90	10.22	24.85	14.21	10.08	10.79	22.28	41.99
10	62.52	36.77			30.81	24.45	8.06	7.11		
11	16.36	15.56								

Key: %(A) = % of first one hundred seconds; %(B) = % of total interaction; asterisks mark sessions which lasted less than 100 seconds in total.

Appendix 5 (Part 1): BABYTALK OF SARAH'S MOTHER
(All sessions)

1. 9.5.75 (aged 8 weeks)

Poor wee thing. Eh? Hello darling. What are we doing to you? What are we doing to Sarah? Eh? What are we doing? What are we doing? Eh? Oh really. That's the girl. That's a good girl. Yes. Yes. You brought up your wind.

You're on candid camera. What are you doing? Eh? Are we going t'have a chat? Are you sitting comfortably? Are you comfortable? Eh? Sweetheart. Hello. Hello. Hello darling. Hello. Eh? Hello. You're looking pensive, aren't you. You're looking very pensive. Mmm. What are you doing? What are you doing? Eh? You don't want to smile. No. No. Eh? You don't want to smile. What we goin' to talk 'bout than? Eh? You do look worried. Eh? Have you got worries? Eh? Are you worried? Are you darling? What's up? What's up? What's up? What are you doing up here? What are you doing up there? Eh? What are you doing up there? Silly girl. Yes you are. What do you see? What do you see? I don't think you're looking at me actually. I think you're looking behind me. I think you are. I do. I think you are. I think you're looking behind me. The lights are a bit too bright. Is it? The lights are bright my baby. Yes. Boobooboo. Yes. Yes it is sweetheart. Yes. It's a bit bright, isn't it.

Eh? It's a bit bright. I'm sure you keep looking past me. There's something fascinating you behind me. Is there? Eh? Something fascinating. Is there? (Whistles) What's happening? What's happening? Boobedeboo. Boobedeboo. You've got your hand in the air. Who's got their hand in the air? Eh? Hello Sarah Ninnies. Hello Sarah Ninnies. Hello. Boo. Boobooboo. Boo. Hello. Hello. Boobedebooboo. I don't think you like the lights, do you. I don't think you like the lights. You're looking a wee bit grumpy, aren't you. Yes you are. Hey. Hey Sarah. Hey. You're looking a bit grumpy aren't you. Are you? You're looking a bit grumpy. Mmm. Mmm. Look at that face. Look at that little chin. Whose chin's that? Eh? Whose chin's that? You're going to sneeze. (Does) That's very antisocial. Sneeze all over people. Yes it is. Yes it is. Silly girl. Ohh. Ohhh. Oh. Yes. It's very antisocial. Sneeze all over people. Yes it is, isn't it. Eh? Isn't it. Yes. You don't look like you feel like chatting very much. No. Boobedeboo. Hello. Hello little one. Little one. Yes. Little Sarah. (Breathing game) What's happening? What's happening? Ahhh. You've hit me on the nose. You've hit me on the nose. Yes you did. (Breathing game) Eh? Hello? Boobeboo. Goodegoo. Little Sarah. Hello. Hello little Sarah. Hello. Little one. You're looking grumpy. Yes you are. I think you're looking very hetty. Eh? Can you refute that with a smile? And a little chat? Yes. Yes. Oh googedegoo. Googedegoo. Hey. Googedegoo. Goo. Good girl. Hello. Gooph. I'll bite your hand off. Yes I will. Silly Sarah. I'm going to bite your little hand off. Yes I am. Yes I am. Chubby face. Chubby face. Oohh. (Laughs) Is it your chubby face? Yes you

are. Yes it is. Yes it is. What a silly face.
 Eh? What a silly grin. What a silly grin. Yes.
 Ooh. Ooh. I'll bite your fingers. I'm gonna eat
 your hand up. Ooh. Ooh. Ah. Ah. Ah. Would
 you like your frilly nappy on the film? Would you?
 That'll be fun. Yes it would. With a few sound
 effects. (Laughs) Mm? Ooh. Ah? Hello. Ah.
 Hello. Hello. Hello. Arms everywhere. Arms
 everywhere. Arms are a good thing. Yes they are.
 They just shoot out all over the place. Yes they do.
 Yes they do. Boobedegoo. Hello. Oh! Oh.
 (Breathing game) Sound effects. (Blows one breath)
 Sound effects. (Kissing noise) Ho. (Kissing noise)
 Ho yea. (Kissing noise) Hhhho yea. Howo yea.
 Howowowowo. Oh! ('Pretend' yawn) Tt, are you very
 bored? Are you very bored? (Laughs) Eh? Are you
 very bored? Cheeky thing. Are you? Hello. (Mock
 yawn) (Simplified yawn sound) (More complicated
 mock yawn) Oo-oo. Oo-oo. Tt, are you very bored?
 You're bored with Mummy's face really aren't you. Eh?
 You're bored with Mummy's face really. Yes. I don't
 blame you. I don't blame you. There must be more
 interesting things. (Mock gulp/cough) (Sucks in
 spittle) (Blows raspberry) (Donald Duck quacking
 noise) Hello. What's that funny noise? Hello?
 (Pants twice, quietly) (Pants twice) See anything
 else interesting to look at? Nothing you can see?
 Just my face? That's boring. Isn't it. Eh?
 That's very boring (laughing). (Sighs) Gosh. Gosh.

2. 15.5.75 (aged 9 weeks)

What are you doing? What do you see? What do you
 see? Hello darling. Hello. Oo-oo-oo-oo. (Laughs)
 Hello. Hello. Are you going to have a talk today?
 Are you going to have a talk? Are you? Oooh. Goin'

t'have - ahaha. Ahaha. You've had a busy day?
 You've had a busy day. Yes you have. Yes you have.
 Yes you have. You've had a busy day my darling.
 Hello. Bobedebop. Hello. Had a busy day? Eh?
 Had a busy day? Hello.

Hello Sarah. What do you see? Boobooboo. Are
 we goin' to have a big talk about it? Oh yes. Oh,
 we goin' to have a big talk about it? Are we? Goin'
 to have a big talk about it? You're clever, aren't
 you. You're clever. You're a clever girl. Yes you
 are. Yes you are. You're very clever. Ooo.
 Oo-ho. Oo-ho. Ooo. Oo-oo. You clever? Ooo.
 Yes you are. Aren't you. Oo. You're a clever girl.
 Oo. What's the matter? Eh? Wha - it's very hot.
 It's very hot with the lights. Yes it is. Yes it is.
 Yes it is. Eh? What's the matter? What you trying
 to grab? Oh struggle-struggle. Little one. Little
 struggle. Eh? Little struggle. Hello. Hello.
 Hello strug. Hello strug. Hello. Hello. Hello.
 You look like you're about to hit me. Are you?
 You're about to hit me. Eh? You wouldn't hit me would
 you? Eh? Little one. Oops. (Laughs) Ooopsee.
 Are you bored? Are you bored with Mummy? Talk all
 the time. Yes yes. (Blows) What is it? (Blows)
 What is it? (Blows) What is it? So hot. It's so hot.
 Isn't it. It's so hot little one. Hello. It's so
 hot. It's so hot. Yes. Booboo. (Kiss) Hello.
 Hello little one. Hello. Hello. (Breathing game)
 I'm going to kiss you. (Kiss) (Laughs) Hello.
 You look like you're gonna hit me. Are you? You
 gonna hit me? You a bit uncomfortable? A bit uncom-
 fortable. Are you? Struggle-struggle. Struggle-
 struggle. Struggle-Sarah. Sarah. Are you gonna
 struggle? (Breathing game) (Laughs) Are you gonna
 struggle? Oo-ooo. What's the matter? You got a

bit of wind or something, eh? (Breathing game)
 Little poppet. Little poppet. Little one. Eh?
 Are you quite comfortable or not? Hello. What are
 you doing, Sarah? Sarah. Eh? Are you gonna blow
 bubbles now? What are you doing? What are you doing?
 What are you doing? Eh? What are you doing? What
 are you doing? Oh, what are you doing? Oh Sarah.
 Oh what are you doing? You silly thing. You silly
 thing. Hello. What are you doing? (Pants) Oo-oo.
 Sarah. Oo. What are you doing? Yes. Little one.
 You're not looking very happy. You a bit hot? Eh?
 (Pants) Happy, are you? Eh? (Blows) What's that?
 (Blows) What's that, eh? (Blows) What's that, eh?
 Boo. What's that? Boom-boom. Eh? Boom-boom.
 Boom-boom. Eh? Oh! Eh? Gonna hit you. You look
 suspicious. You're a bit suspicious. You a bit
 suspicious? It's very hot, isn't it. Eh? It's
 very hot. Yes it is. It's very hot. Yes yes.
 It's very hot isn't it. Eh? (Blows) Look at all
 those bubbles. Look at all these bubble-bub-bub-bub-
 bub-bubble-bubbles. Look at all these bubbles.
 (Laughs) Look at all your bu-bu-bu-bubbles on your
 mouth. Look at them all, eh? Look at all your
 bubbles. Little one. Little one. (Pants) You
 gonna dribble. You're gonna dribble and I haven't got
 anything to help. No. You gonna dribble. (Pants)
 Eh? Hello blue eyes. Hello blue eyes. Yes. Aaow.
 Yes. Hello. Hello. Oo. You look like you're
 gonna fall out. Are you? You look like you're gonna
 fall over. Are you? Chicka-chicka. What do you
 see? What do you see? What do you see?

3. 23.5.75 (aged 10 weeks)

(Laughs) You're looking sad, aren't you. Eh?
 (Laughs) No. Don't frown. Don't frown. No no no.

No no no. Don't frown. (Laughs) Eh? Don't frown. Bubble-bubble-bubble. (Laughs) We gonna have a chat? You and me. Oh, you gonna blow up some of your Ribena by the look of it. You're gonna blow up some of your Ribena. What did you think of that? Eh? Sweet-heart. Eh? Hello. Oo, oh. Hey-hey. Hey-hey-hey. What did you think of that? Booboo. What did you think of that? Oh darling, don't cry. No. No no no. You don't look very happy today, do you. Eh? You don't look very happy today. What's the matter? Eh? Oo. What's the matter? Are you not very happy? Eh? Not very happy. Sarah. Hello. Hello. Hello. Are you complaining about it? Are you complaining about it? Yes. You're complaining about it. Ooo. It's not good enough, is it. Eh? It's not good enough. Ahh, sweetheart. Eh? Sarah. Sarah. Eh?

Are you gonna have a grumpy day today?

Sshh. Little one. Little one. What is it? Oo. Oo. You gonna get cross about it. You gonna tell me off for doing this to you. It's not good enough. Little one. It's not good enough. No. It's not good enough is it. Boobooboo. It's not good enough. Oo Sarah. Oh little one. Ah little one. Little one. What's the matter. Little one. Little one. What's the matter? You keep crying. You keep crying.

4. 30.5.75 (aged 11 weeks)

Are you gonna tell a few jokes? Whaddya-think? Ho-whaddaya-think? Hoowo. Whaddaya-think? Ho-ho-ho. Whaddaya-think? Booboo, booboo. Whaddaya-think Sarah Ninnes? Booboo, booboo. Hello. Hello.

What you up to? What you up to? Eh? Are you gonna tell me a story? (Mock yawn) You're not long awake, are you. Eh? You're not long awake. No you're not. No you're not long awake. And did you have a good sleep? Did you have a good sleep? Did you? Suck-suck. Suck-suck. Ber-ber. Get your fingers out of your mouth. Come on. Come on. Ow-ow. (Laughs) Yes I will. O-wer. I'll chew them. I'll chew them. I'll chew your fingers. Ow. I'll chew your fingers. I will do so. I will. You're not going to have a talk with me today. Hey. Sarah. Hello. O-wo-wo. You're not going to have a talk to me today. Do you not? Aw-ba-ba-ba. Ba. Ba. Not going to have a talk to me today. Just gonna sit quietly. Are you? Ow. O-wer-wer-wer. O-werr. Just gonna sit quietly? Are you? Ow. I'll eat your fingers up. Ah, pikkinini. Pikkinini. Aow, what's the matter? Hey-hey. Hey-hey. Hey-hey-hey-hey. No we don't. No-no. Are you not comfortable darling? O-wo-wo-wo. Ahhh Sarah. You gonna have a grizzle. Are you? You gonna have a grizzle. Ahh. Ah, sweetheart. Oh what is it? You complain about it. If you don't like it, you complain about it. (Laughs) Yes. You have your say. You have your say. Yes, o-wer. Ahhh. It's not good enough, is it. It's not good enough. Is it. It's not good enough. No. You haven't even had your Ribena have you. Hey. You haven't even had your Ribena. Noo. Just woken up. Yes, you've just woken up. And you're gonna suck your fingers. You're gonna suck your fingers, aren't you. As usual. Your new toy. (Makes sucking noise) Yes you are. Yes you are. Hello. Ah. (Makes sucking noise) Yes you are. Aooow. Aooow. Ow. What a salivating sausage. Ow. What a salivating sausage. You're not gonna take your

fingers out of your mouth when you talk to me. Are you not? Eh? Sarah. You're not gonna take your fingers out of your mouth. No you're not. You're not gonna take your fingers out. You're not gonna take your fingers out of your mouth when you talk to me. Are you not gonna take your fingers out. Are you not? Are you not gonna take your fingers out of your mouth. Eh? You're not? Do you want some Ribena? You think you might do? Aowowo Sarah. Aowowo. Ow sweetheart, eh? You wanna drink.

5. 6.6.75 (aged 12 weeks)

Sarah. You got a grubby face. Hey Sarah. Eh-bobede-bobede-bobede-boash. You not going to say Hello? Are you going to say Hello today? Sarah. Sarah, your hands are fascinating, aren't they. Sarah. Hello. Hello poppet. Hello poppet. Hello booboo. Hello booboo. C'mon. C'mon. Are you just goin' to suck your thumb? Are you just goin' to suck your thumb? Haaaa. Chew-chew-chew. Chew-chew-chew. Are you just going to suck your fingers the whole time. Are you? (Makes sucking noise) Are you just going to suck your fingers the whole time. Are you? Are you not going to talk to me? You're not going to talk to me? Ah. Yes, you have a bit of a conversation. (Laughs) (Makes sucking noise) Are you gonna have a bit of a conversation or are you just going to suck your fingers? Eh? Hello. Hello. Hello. Boo-booboo. Booboo. A-booboo. Hello booboo. Hello booboo. Hello booboo. Hello. Berammmmm. Oh! Hello. Hello. Oh. Oh. Oh. (Laughs) Oh. Are you just gonna suck your fingers? Yes you are. Yes. Booboo. Booboo. Hello. Hello booboo. Ahhhh. Ahhhh. Yes. You just gonna suck your fingers the whole time. Are you? Oh - you're not. You don't know. You're just gonna suck your fingers

the whole time. Specially your thumb. That's the
 favourite, isn't it. What a good thing thumbs are.
 Aren't they. Aren't thumbs great. Eh? (Laughs)
 Aren't thumbs great. Aren't thumbs terrific. Eh?
 Aren't thumbs terrific. Sarah. Talk to me. Booboo.
 Booboo. Sarah. Hey. Aowerwerwer. Babababa.
 Babababa. Ber-ber-ber. Hey. Are you not going to
 be happy? Sarah. Sarah. Hello booboo. H've you
 got the pip with me. Hey - got the pip with me?
 Have you got the pip with me. Have you? Have you
 got the pip with me. Yes. I been - I been lugging
 you round today. Have you got the pip with me.
 Aowowowo. Aowowowo. Awoo. Hello. Ow-ow-ow.
 Oh, little one. Aow little one. What is it? What
 is it? Eh? Are you going to tell me off? What did
 I do wrong? Have I been lugging you all round town?
 Nooo. Ahh, little one. Little one. Ah little one.
 No, you're not going to cry. You're not going to cry.
 You're not going to cry. No you're not. Ah booboo.
 Hey booboo. Don't struggle. Hey booboo. Don't
 cry. Hey hey. You are. You're gonna have a grizzle.
 Aowowo. Aowowo. Owow. Oh, you're telling me off,
 aren't you. You're telling me off. What have I done.
 Eh? Are you telling me off? Are you gonna tell me
 off and suck your fingers? And Ribena's not good
 enough. And Ribena's not good enough. You wanna
 chocolate milk-shake. Didn't you? You wanna choco-
 late milk-shake. What's the matter? Eh? What's the
 matter? Aowowo. What's the matter? What's the
 matter? Hawowo. What are you telling me poppet.
 You're telling me off aren't you. Eh? Ah. Little
 one. Little one. Sshh. Little one. Little one.
 Hey. Are you gonna be grizzly? Are you gonna be
 grizzly?

6. 13.6.75 (aged 13 weeks)

Hey. How you feeling on it? Have you noticed anything? Have you noticed anything different? Eh? Are you gonna bite it? Ah, don't put your thumb in your mouth. Booboo. Aa-booboo. (Laughs) Aa-booboo. Don't put your thumb in your mouth. You're not gonna get grizzly. Oh no. No-no-no. You're not gonna get grizzly. Nooo-nonono. Ah poppet. Poppety-pop. Pop-pop-pop. What is it? What is it? You gonna get grizzly? You gonna get grizzly? Are you? Oh noooo nono. Sarah. Booboo. Booboo. No-no-no. No-no-no. You gonna get grizzly darling? Are you? Are you gonna get grizzly? Mm-(kiss)-oooo. That's not very good. That's not very good. No-no-no. That's not very good. You're not gonna have a chat today. You not gonna have your chat? You're just gonna have a grump. Sarah. Hello darling. Hey, sweetheart. What's the matter?

It's just me you don't wanna talk to isn't it.

Hello darling. Have you been playing with the ball? Have you been chasing the ball? Have you poppet? Eh? Have you been chasing the ball? Eh? Booboo. You been chasing the ball have you. You been chasing the ball. Oh. Not gonna tell me that you're sick of it all. I'm not the person you grump to. Nooo-nonono. Hey poppet. Aaaa. Ah-ah. Do I only get the grizzle side? Sarah. (Laughs) Sarah. Did I go out and leave you last night? A'you giving me a hard time? A'you giving me a hard time. Eh? Diddleenddleer. Booboo. Hello booboo. Hello booboo-oo. Hello booboo. Hello booboo? (Laughs) (Kisses) Are you gonna ignore me? Are you gonna ignore me? Hey Sarah. Are you gonna ignore me? Are you? Eh? What's the

matter? What's the matter? Hey booboo. You're not gonna chat to me today. You're giving me the cold shoulder. Aren't you. You're giving me the cold shoulder.

Sarah. I'm here. You're not interested at all. You're hopeless. You're not gonna talk to anyone are you.

Booboooboo. Boo. Hello booboo. (Laughs) Hey Sarah. Booboo. Are you - are you gonna say Hello to Mummy? Are you gonna say Hello to Mummy? Are you not gonna say Hello to Mummy. Are you not gonna say Hello to Mummy. Ooo-booboo. Hello darling. Hello. Sarah Ninnes. Sarah Ninnes. Hello. Ooohh. Grizzly-grizzle. What's the matter, you just had a feed. Ah-booboo. You not gonna talk to Mummy? Eh? You not gonna talk to Mummy? Lalalalala - ooh. (Kisses) (Clicks tongue) Hey Sarah. Sarah Ninnes. Hello. Hello. Hello darling. You not gonna have a chat at all? No. You're just gonna suck your thumb. You're just gonna suck your thumb. Aren't you.

7. 20.6.75 (aged 14 weeks)

Trouble is, usually you talk to everybody else far more excitedly than you talk to me. Nice to have a fresh face to talk to, isn't it. Eh?

Hello booboo. Hello booboo. Ayaaa. What are you doing here again? What you doing here again booboo. Hey booboo. Aa-booboo. Aa-booboo. Hello doll. Aa-aa-haa. What we doing here again? What are we doing here again (singing)? You not very comfortable? You not very comfortable in there. Are

you? Is it tight enough? Is it tight enough? Hey.
 Is it tight enough. Is it not tight enough. Aahhh.
 Are you not very happy in that chair? You lost your
 booty. You lost your booty. Lost your booty.
 Didn't you. You lost your booty. Yes you did.
 What's that? That's off your foot. That's off your
 foot. No? No? Eh? You not very secure in that
 darling? Boobooboo. Boobooboo. You not very
 secure in that? You not very secure in that? Shall
 I put it back down here? Can you talk to me? Can
 you talk to me? You going to talk to me? Tell me
 what a grim life you have? You going to tell me what
 a grim life you have Sarah? Y're really struggling
 with this today aren't you. Eh? Hello booboo.
 Hello booboo. You're not very happy with this today,
 are you. Hello booboo.

Hey. What's the story. What's the story. Hey
 Sarah. Sarah-Sarah-Sarah. Booboo. Hello booboo.
 You wanna see what's down there. You're not getting
 to see it. No, you're not getting to see it. Hello.
 Hello. Hello darl. Hello. What's that? You
 don't wanna talk today. You wanna play with things.
 You want to play with things. Booboo. Ah. Lalala-
 lalala. Lalalala. What's the matter? Hey. You
 wanna play with something don't you. You don't wanna
 talk. You don't want to talk. You don't wanna talk.

She wants to play. Faces are boring. Unless she'd
 talk to you.

You're just being the passive listener. You're not
 going to say a word. Hello. Hello. Hello booboo.
 Sarah Ninnes. Hello little Sarah. Hello little
 Sarah. Hello booboo. Hello booboo. Booboo.
 Hello. Can you see them through there? Eh? Can

you see them through there? Hello booboo. You're not going to talk to me are you. Eh? You're bored with me. You're bored with Mummy. Aaa-booboo. Hello booboo. Hello boo. Hello boo. Hello boo. (Clicks tongue) Babababa. Hello bababa. Aaoww. Aaaoww. Aow-bo-ao-o. Hello. Ba-ba-ba. Little Sarah ba-ba. Little Sarah ba-b-. Ao-woowoo. Ao-woowoo. Oo-bwerbwerbwer. Ah. Ah-ah-ah-ah. What is it? Hello? Hey. A'you not going to tell me anything? A'you just gonna dribble. A'you just gonna dribwerbwerbwer. Aaa-aow. Is that right? A'you - goin' to tell me off? Have you had enough of this? Have you had enough? (Audibly exhales) Have you had enough? Have you had enough?

8. 27.6.75 (aged 15 weeks)

Hello. You a good girl. Eh? You're a good girl. You a good girl. Are you? What's happening today? Do you know what's happening today? What a time-table we're having. Aren't we. Eh? What's happening today booboo. Owerwerwer. Pikkinini. Pikkinini. Pikkinini. Pikkinini. Pikkininipoo. You've got a hair in your mouth. Yes you have. Papapapapa. Hey. Pgh-gh-gh. Hey booboo. (Pants) Sarah. You talk to Mummy. You talk to Mummy. Hello booboo. Hello. Hello. Ow-ow. Are you gonna tell me a story today? So are you gonna tell me a story? You've not got any stories just now. Eh? Oo-oo. You not got any stories. Sarah Ninnes you're a booboo. Booboo. Sarah Ninnes is a booboooboo. Sarah Ninnes - . You not got any stories. Have you not got any stories? No? You're very intent on things aren't you at the moment. You're more intent on things. Booboo. Aoww. Booboooboo. Ow-ow-ow-ow. (Laughs) Ow-ow-ow. What're you doing? What you doing? Hey Sarah.

Lalalala. Hey booboo. What you doing? What you doing? Eh? What you doing? (Clicks tongue)
 Papapapa. (Clicks tongue) Oh dear.

9. 8.7.75 (aged 17 weeks)

Yes. C'm - we're meant to talk. I suppose you think that you're gonna - give you this. Hey. Aa-ha. (Laughs) Are you gonna play with that? Are you gonna play with that? (Clicks tongue) Ahllo-booboo. Allo-booboo. (Clicks tongue) Ha. Ha-ah-ah. Ha-ah-ah. Hello. Sarah Nannes - you're a booboo. (Clicks tongue) Hello darling.

Would you rather I took this off her? Would you rather I took this off her?

What's happening? Weyya. Hello Sarah. Oh, come on. You're cheating. You're gonna cheat aren't you. You're gonna cheat. You're gonna cheat. Ah-ha-ha. Ha-ha-ha. You're gonna cheat. Aa-aa-aa. You're gonna cheat. Ooooo. (Clicks tongue) (Clicks tongue) Booboo-baaa. (Laughs) (Laughs) Ah! Hey. Hey. Don't be such a bully. (Clicks tongue) Boobooboo-ber. Hello. (Laughs) Hello. Baba. Bababaa. (Laughs) Bababa. (Laughs) What's this: (Makes sucking noise)? (Sucking noise) (Laughs) You're cheeky. You're cheeky. Little booboo. Baba. Baba. Hello. Sucking's good eh. Eh-eh. (Clicks tongue) Boo. (Clicks tongue) Ha! (Clicks tongue) Babababa-baba-baba-baba. Boobooboo-ber. Booboobaa. (Makes Donald Duck quacking noise) (Donald Duck noise) (Laughs) You're silly. You're silly. (Clicks tongue) You're silly aren't you. (Clicks tongue) Yes. Hello. There's your toes with the funny bootees on. Hey-hey. (Sucking noise) (Clicks tongue)

(Sucking noise) (Laughs) (Sucking noise) I'll eat your fingers up. What a piggy noise this is going to be isn't it. What a funny thing. Where's your thumb? Hey. Where's your thumb? (Sucking noise) I'll eat them. I'll eat your fingers. (Sucking noise) I'll eat your fingers. Yes I will. I'll eat your fingers. (Sucking noise) (Laughs) I'll eat your fingers. (Sucking/popping noise) Ah-ha. Who you hitting in the face? Hey. Sarah Ninnes. Ah-oo. Sarah Ninnes. Aa-oo. Sarah Ninnes. (Snorts) (Laughs) You got me by my nose. (Snorts) (Clicks tongue) Hello. Hello.

[You're sucking hair there kid. You're sucking hair there kid.]

10. 14.7.75 (aged 18 weeks)

Hello darling. Are you gonna chew your little dress? Are you gonna chew your little dress? Are you? Hello darling. Hello. Sarah. Sarah. Hello Sarah. Are you gonna look round the room? You're not gonna look at me. (Blows raspberry) Are you not gonna look at me? Little one. Little one. Do you want to look at something? You don't want to look at Mummy? Little dancing bear. Little dancing bear. You're a little dancing bear. You're a little dancing - . Hello darling. Hello. (Clicks tongue) You're not gonna talk to Mummy. Sarah. Hello. Hello. Hello. You're not gonna talk to Mummy. (Clicks tongue) You're not gonna talk to Mummy. Hey poppet. Poppet. Poppet. Poppet. Hello little poppet. Daddy's little poppet. (Makes noises) Are you gonna s- Are you gonna chew your dress. Are you gonna chew your dress. Are you gonna chew your dress. Bler-bler-bler-bler. Bler-bler. Are you gonna chew

your dress? Eh? (Clicks tongue) Are you gonna
 chew your dress. Coo-oo. Sarah. Booboo. Hello
 Sarah. Hello Sarah. Hello. Hello Sarah. Hello.
 You don't know what you're gonna do today do you. No.
 No. Poppet. You're not gonna look at Mummy. Do
 you want your bear? (Clicks tongue) Hello little
 Sarah. Hello little Sarah. Are you gonna chew this
 all the time? Are you gonna chew this all the time?
 Are you? Why don't I take it off you. Why don't I
 take it off you. Hallo. Babababa. Babababa.
 Babababa. Babababa. Hello. Hello. Hello Sarah.
 Hello Sarah. Hello. (Clicks tongue) You not know
 what you're gonna do today but you're gonna chew this
 jacket aren't you. (Mock chewing) You're gonna chew
 your jacket. Yes you are. You're gonna chew your
 jacket aren't you. Eh? Going to chew your jacket.
 And your gonna cheat and look through the window. Yes
 you are. Mmm. What's the matter? What's the
 matter? Eh? (Sighs) Oh dear. Oh dear. Oh
 dear. Oh dear. Oh dear. Oh dear. Oh dear. Oh
 dear. Oh dear(with laugh). You're just gonna chew
 that aren't you. Quite happily. Quite happily.
 You're gonna chew that you're gonna chew that. Baba.
 Baba. Babababababa. Owowoowowowo. Shall I take
 it off? I'm gonna take it off. Eh? Is it too hot?
 There we are. There we are. You don't know where
 you are. Eh? You don't know where you are. You
 don't know where you are. Eh?

What do I do? What do I do? Talk to my baby.
 Babababy. Talk to my babababy. What can you see?
 Yes you've found out. You found out. You've found
 out what it's all about, haven't you? Eh? You found
 out. You've found out what it's all about. Ah.
 You don't like this being tied-in very much, do you.
 You've found out what it's all about. You've found

out what it's all about. (Laughs) Hello booboo. What you looking at? Ah. You really do get a bit of a wriggle on. Hey. (Clicks tongue) Where's your dancing bear. (Laughs) You stop that. Let me go. You let me go. You let me go. (Clicks tongue) Nonono. Bee-bee-bee. Oh no-no-no. Don't you cry Sarah. Don't you cry.

Yes you are. Oh no, you want to play with it. Look who's here. Hey sick. Hey-hey. What's this? Blabla. (Clicks tongue) Ahh-ha. Went in the mouth. Sarah. Hello booboo. Hello. Hello. Are you gonna eat it? Are you gonna eat it? Ah darling. Has it got a sharp edge on it? Ahh darling. Ahh little one. Ahh little one. No-no-no. No-no-no. Noooo-no-no-no. Hey. Yes? Was there something sharp on it? (Makes a noise) Was there something sharp on it? Hey darling. Sarah. Sarah. Eh? Sarah. Hello. Hello. Hello baba. Owowowo. Lalalalala. You can see through there can't you. You can see through there. Ooohh. Ooohh. Aahh. You can see. You've fathomed them out haven't you. Eh? Cuckoo. You've sussed them out. You've sussed them out. You can see what's in there. Hey. Hey. Sarah. Hey. Booboo. Lalalalalalala. (Kissing noise) Hey. Hey. (Clicks tongue)

11. 23.7.75 (aged 19 weeks)

Look at Mummy's big girl (laughing). Look at Mummy's big girl. What've we got here. Eh? Hey? Hey? (Blows raspberry) What've we got - You got a dress to chew, haven't you. You want this. You've seen it. You want it. Do you want it? (Laughs) You're not meant to hang. You're not meant to lean forward by that much. Bibedebababa. Hello. Ahhh. Hey Sarah. Sarah. Sarah. (Blows raspberry) Are

you gonna do that for me? Gonna do your new trick?
 Are you? You gonna do your new trick? Gonna do your
 new trick? Y'gonna do your new trick? Hey. Baba-
 baba. Ahhh. Baba. Hello. Y'gonna tell me a
 story? Or are you just gonna swallow this damn thing.
 Eh? Y'gonna tell me a story? Go on. Come on.
 Ahhh. Sarah. (Blows raspberry) What about your
 new rude noise? You're not gonna give us a shot of
 that? (Laughs) That's what happens. I'm not going
 after it. I'm not going after it. Boobooboo. I'm
 not going after it. Bababababababa. (Kisses)
 Ahhhh. (Blows raspberry) Come on. Ah-ah. (Suck-
 ing-in noise) Aren't skirts fun. Aren't dresses
 fun. Eh? Aren't dresses fun? You can get to chew
 them. Eh? Aren't dresses fun. (Blows raspberry)
 Aren't dresses fun. Is this very very tight? Eeh.
 Ahhhh. (Kisses) Bababababa. Booboobooboober.
 It's your new dress. Yes. Yes. That's a nice new
 dress. That's a nice new dress. (Clicks tongue)
 Yes. And there's your feet with socks on them.
 There's your feet with bootees on them. B-b-bootees.
 (Laughs) (Snorts) Hello. Yes, you got bootees on
 them. You got bootees on your feet haven't you. Do
 you wanna get at them? Do you wanna get at them? Eh?
 (Squeaky noise) Do you wanna get at them? Ahhh.
 (Laughs) Are you gonna show off your panties? Are
 you? Who's that? You can see them can't you. You
 can see them. (Laughs) Yes. You wanna get at your
 bootees. You want to get at your bootees (chanted).
 Ye-es. Hey. Sarah. A-boo. (Raspberry) (Laughs)
 (Raspberry)

She's quite good-humoured today.

12. 31.7.75 (aged 20 weeks)

Hello sweetheart. Beebeembeam. Hello sweetheart.

Where are we. Where are we. (Laughs) Where are we. What are these things hanging away down here? (Blows raspberry) What are these things? Where are we? Are you gonna talk to me? Are you gonna talk? No. No you're not. Sarah. Blerblerbler. (Raspberry) (Raspberry) Look the other way why don't you. Sarah. Sarah. Sarah. Hello Sarah. Hello Sarah. Beebeebabee. Hello Sarah. Boobooboo. (Clicks tongue) Hello? Hello? Hello Sarah. Hello Sarah. Hello? Hello Sarah. Hello Sarah? Hello? Hello? You gonna talk? Bumbumbum. A'you not gonna talk? Ah berberberber. Sarah Nannes. Hello. Hello. Babababa. Ber. Berblaugh. Blaugh. Hello. You gonna play a game with me? You gonna play a game? You gointa play a game with me - you goin to play a game - goin to play a game - goin to play a game. Hey-hey-hey, goin'a play a game. Oo-oo. Hello funny face. Are you goina talk? No. You're gonna look at anything else other than me. Sarah. Sarah. (Raspberry) Sarah. (Raspberry) Sarah. (Noise) Sarah - you've got cold hands haven't you. You've got cold hands. Hey booboo. Hey Sarah. (Tongue clicking/song) (Clicks tongue) Sarah, hello. (Pants) Huer. Hello. Baba. (Pants) (Whistles) (Clicks tongue) (Whistles) What do you want? Do you want your dolly? Do you want your dolly? Do you want your dolly? You don't seem to want too much. Hello. Hello. Ahhh. Aowowoo. Ah chicken. Yes, you want out. You want out. Oh booboo. There we are. You don't want to just talk to me. You want me to pick you up. You want me to pick you up. Oh beebie. Ah sweetheart. (Kiss) (Kiss) (Kiss) You'll probably be happier on your own. Owowowow. I gotta pick you up. A'you telling me? Are you telling me? Are you telling me? I've gotta pick you

up. Is that what you're telling me. I gotta pick
you up. I gotta pick you up. Bababwer. Oh, it's
hot. Yes. You're hot booboo. Aow-aow. Aow-
werwer. Berwerwer (laughing). Berwerwer. Give it
back. Aow. Aow. (Laughs) (Kisses) (Sucking
noise) Berberber. Berberberberber. Berberberber.
Bababababa. (Sucking noise) Oh no, you don't want
that game. Oh. No you don't want that game. What
game do you want? What game? What game? What game
do you want? Nice fingers. Lalalala. Lalalala.
(Raspberry) (Sucking noise) (Laughs) Who can you
see? What can you see? Eh? Oh you want me to pick
you up baby. You want me to pick you up. You want
me to pick you up (sung). (Raspberry) Ahhh-boo.
Ahhh.

Appendix 5 (Part 2): BABYTALK OF THE MOTHERS
OF JOANNA, ANGELA, LEIGH, JAKILENE AND JULIE
(One session each)

Joanna 7.5.76 (aged 10 weeks)

Yes you are. Are you feeling better now? Are you?
Are you feeling better now? Oh you're not to chew
your hand. You're not to chew your hand. No.
You're not to chew your hand. I can't see your face
if you chew your hand. No. I can't see you smile.
Eh? (laughs) Are you quite happy? Are you quite
happy? Are you? Look you're all - . Look at your
hands. You not - . Oh dear. That what you wanted
rid of - eh? That what you wanted rid of? Is it?
Is that better? Have you got rid of that? Have you?
Yes. Quite happy being sick there are you? 'Re you
quite happy being sick there? What? You tell me
then. You tell me what your tummy's like eh? What?
Tell me then. Tell me what your tummy's like. Eh?
What is it then? Come on. Are you gonna be sick
again? Eh? Gonna be sick again? No you're not are
you. Don't chew your hand, it just makes you sick.
(laughs) It just makes you sick, doesn't it?
That'll just make you sick again. Won't it? A - .
Oh dear! Oh dear. (laughs) If you want it. If
you want to chew it. Oh goodness! Oh goodness -
you'd think you were hungry. You'd think you were
hungry. You're not hungry are you? You're not
hungry. No you're not. You're wobbling about there,
aren't you. What? Tell me then. Come on then.

You have a big story then. Eh? No. No. You just make yourself worse doing that. You do. What. I don't want to see your tongue. I don't want to see your tongue. Look. You'll make yourself sick. You'll just make yourself sick. Aha. See there? You did - . That wee bit there. There y'are. There you go. Hah. Come on then. Just gonna sit there and be sick all day? Are you? What do you see round there? What do you see round there? Oh you're having a wee look round now. You're having a wee look round. You've got fed up with your Mummy. No? You're not fed up with your Mummy yet? What? Oh now - . What you doing now. You're filling your nappy. Aren't you? Aha? Is that what you were doing? Were you filling your nappy? Were you? And have you got rid of all your sick? (laughs) Aha - . You have, haven't you. Have you? Yes. You like sitting there kicking, do you? Do you like sitting there kicking? What? Tell me then. (laughs) Tell me then. Yes, see, you're gonna fall out of that. You'll fall out of that if you don't watch. You will too. You're goin' to fall out of it. What? Are you goin' to fall out of that. Eh? Yes. You giving 'em big smiles again, eh? Are you? You gonna tell me a story? Come on then. Tell me a big story. Come on tell me a big story then. What? What? Oh not again. You're not gonna be sick again are you? What? What is it then? Tell me then.

Angela 28.6.76 (aged 10 weeks)

Hey madam, what've you been doing? Hello darling. Hello darl. Give big smiles. Lovely smiles. Ha. You're a good girl aren't you. Do you like that? Do you like that? You been a very very good girl. Yes

you are. You been extremely good girl. Mummy says
 she like, she's very proud of you. Very proud of you.
 Is that wet? Ph - oh dear. What have you got in it?
 Yes darling. What are you trying to tell me? What
 are you trying to tell me? Hm? Yes. We're going
 away tomorrow. What a good girl. There's a good
 girl. Were you sleeping all through the time? Were
 you sleepy? Enjoying a little sleep. Yes you were
 enjoying it. You were enjoying your sleep weren't
 you. Yes. Yes. You were enjoying your sleep
 weren't you. You were enjoying it. Yes. Yes.
 You'm big smiles. Big smiles. That's the thing.
 Yes. What is that? What is that? Yes, what is it?
 What is it? What are you looking at? What are you
 looking at? Yes, what's the matter? You're
 stretching your legs out. Are you cold? Cold
 tootsies. One two three. One two three. You've
 got cold tootsies haven't you. Mummy'll keep them
 warm for you. Mummy'll keep your tootsies warm for
 you. Will she? Will she? Mummy'll keep your
 tootsies warm for you. Yes darling. Mummy'll keep
 your tootsies warm for you. Aw. Yes. Yes.
 You're trying to get out of that seat aren't you.
 Going to have a little walk? Hm? Trying to get out
 of it. Yes you are. You trying to get out of that
 seat aren't you. Yes you are. Trying your level
 best. Yes you are. Yes. Yes you are. You're
 trying to tell me something too aren't you. Yes.
 What are you trying to tell me? (laughs) Yes you're
 trying to tell me something. Come on darling. Yes,
 what is the matter. Yes darling. (Angela farts)
 Oh dear! Are you doing something? Are you doing
 something? Yes you are. You've done something.
 Your Mummy says you've done something have you?
 Y'need a little change. Yes. Need a little change,

hm? Yes. You need a little change? You need a little change. Yes. What are you trying to do - . Trying big smiles for M - . Yes darling. O.K. What are you trying to tell - . You tell me something. That's it. Is that better? Nice and clean. Who's a nice little clean baby? Who is a nice little clean baby? Who's a clever baby? Who is a clever baby? Angela. Angela's a clever baby is she? Yes. Ye - . Yes who's a clever baby? Mummy's clever baby. Mummy's clever baby. Yes. You been a good girl? Who's been a good girl? Mummy says Angela's been a very good girl. You've been a very good girl. Yes. You've been a very good girl. You've been a very good girl. You tired? Oh. I don't think you are. You enjoying yourself? You enjoying yourself? Yes. You enjoying yourself? Mummy's little girl. Mummy's little girl. Who's Mummy's little baby. Come here. You can have my finger. Hold my finger. There we are. Mummy says she can hold your finger. Yes. Let's have a smile. Who's a good girl? Who's a good girl? Yes. What else are you trying to tell your Mummy. You tired. Oooo-up. What is that. What's so nice? What is it that's so nice. Are you watching that? That's the camera. Do you like it? Do you like it?

Leigh 20.8.76 (aged 11 weeks)

Who's Mummy's darlin'? Hm. Pull your dress down. Will I pull your dress down? Will I pull your dress down? (beginning to chant) Oh! You're blowin' bubbles. (laughs) Who's my girl? Who's my girl? Are you getting fed up? Hn? Are you gettin' fed up? (laughs) Are you gettin' fed up? Give me a smile

then. Give me a smile. Are you gettin' fed up
 darlin'? (kiss) Eh? Are you gettin' fed up? Are
 you gettin' fed - . Oh dear! Hn? Ohhh. Here-
 here. Here. Are you gettin' fed up? Are you
 gettin' fed up? Eh? Who's my girl? Who's my girl?
 Eh? Where's my girl? Ohhh. Ohhh. Oh dear. Oh
 dear dear. Oh! Oh! Oh! Oh, my darlin'. Oh my
 girl. What's the matter? Oh. Ohhh dear. Oh.
 Ohhh dear. Oh darlin'. Here here here. Ahhh - .

Jakilene 26.8.76 (aged 9 weeks)

Jakilene. What do you see? What did you see?
 What did you see? Was that a wee mask? Was that a
 mask? Oo you're a slavery thing. You're a slavery
 thing. Come on then. Come on. Come on. Come on
 then. Come on then. What's wrong wi' you? Come
 on. What're ye seein'? Where are your hands? Your
 pretty hands. What are ye seein'? Jakilene.
 Where's the big smiles? Jakilene. Where's the big
 smiles? Where's the big smiles? Come on then.
 Come on then. Where's the big smile. Ho! What a
 big smile! Come on then. Come on. Come on then.
 Come on. Come on. Come on. Who's got tickly feet?
 Got tickly feet? Have you got tickly feet? Have
 you? Are you saying "Aye"? Have you got tickly
 feet? Have you got tickly feet? 'Ve you got tickly
 feet? You have so. You have so. You have so.
 Come on then. Come on then. (nose noise x 3)
 Ckhhh! (nose noise) Like you. Like you yourself.
 Like you yourself. What're you sayin'? You tellin'
 me stories? Are you tellin' me stories? Are you
 tellin' me stories? Are you tellin' me stories?
 Come on then. Come on then. Come on. Come on.

Ha. Oo, that's a big one. That's a big one.
 That's a big one. Oo. What? Boxing. What's that
 in your hand. What's that in your hand. What's in
 your hand. Come on then tell me stories. Come on
 then tell me stories. That's a big one. Tell me a
 big story. Tell me big stories. Eh? Come on.
 Come on. Tell me stories. Hn. Tell me stories.
 A-aa. Come on. Oh! (Jakilene is sick) Oh dear!
 Oh dear! Oh dear! Oh dear me! Aagh! Aagh! Oh
 she's a messy thing. Oh! You're a messy thing.
 There you are. There you are. Sshhh. You're a
 messy thing. You're a messy thing. You are so.
 You're a messy thing. You're a messy thing. Are you
 being sick all over the place? Are you being sick?
 You are so. Yes you - come on then. Come on then.
 Come on. Come on. Coh. Coh. A'ye boxing? A'y
 boxing? A'y boxing? Come on then. Come on then.
 Tell me a story. Tell me a story. Tell me a story.
 Jakilene. Jakilene. Jakilene. Jakilene.
 Jakilene. Come on then. A'you blowing bubbles?
 A'you blowing bubbles? A'you blowing bubbles? A'you
 blowing bubbles? Ho! Come on then! Come on then!
 Come on then! Come on. Come on then! Honey.
 Honey. You got tickly feet. You got tickly feet?
 Who's got tickly feet? Who's got tickly feet? Come
 on. Ho. Come on. Ho. Are you sicking. Are you
 sicking. Agh! (imitation of Jakilene) Agh!
 (imitation of Jakilene) Come on then. Come on, tell
 me stories. Tell me stories. Honey. Tell me
 stories. Hn. Oh dear! Oh dear, she's tired. Oh!
 She's tired. Jakilene's tired. Tell me stories.
 Look at you! Look at you! You're dribbling. You're
 a dribble. You're dribblin'. You're dribblin'.
 You're dribblin'. You're dribblin'.

Julie 14.10.76 (aged 12 weeks)

Where's the big girl? Where's the big girl? Eh?
 Where's the big girl? Julie! Where's the big girl?
 Where is she? Eh? Where is she? Eh? Where's the
 big girl? Eh? Where is she? Come on then. Tell
 me big stories. Come on. Come on. Yees. Ooooh.
 Tell me big stories. Eh? Tell me big stories then.
 Come on. Big smiles. Where's the big smiles.
 Yees. What do you see? Eh? What do you see? Eh?
 What did you see? Come on then. Tell me. Tell me
 then. What did you see? Come on. Tell me a big
 stories. Come on then. Yees. Come on then. Come
 on. Tell me a big stories. Come on. Come on then.
 Ooooh. Ooooh what are you doing? What are you doing?
 What are you doing? W-what are you doing? Come on
 then. Yees. Come on. What do you see? What do
 you see? Eh? What do you see? Come on then.
 Come on. Tell me a big stories. Come on. Yees.
 Come on then. Come on then. Tell me a big stories.
 Come on. Tell me the big stories then. Come on hen.
 Come on now. Come on then. What do you see? Eh?
 What do you see? Yees. Tell me. Yes. Tell me
 then. Tell me big stories. Yees. Yees. Yees.
 Come on hen. Tell me a story. Tell me the big
 story. Come on then. Come on then. Come on now.
 Yes. Tell me. What do you see? Come on hen.
 Ooooh. What do you see? Come on then. What did
 you see? Tell me. Come on. Tell me a big stories.
 Yees. Come on hen. Come on then. Come on. What
 did you see? Eh? What are you watching? Yees.
 What are you watching? Eh? What are you watching?
 Yees. What are you watching? What are you watching?
 Eh? Ooooh! What do you see? What did you see?
 What did you see? What do you see? What do you see?

What do you see? Eh? What do you see? Mm? Come on then. What did you see? Eh? What are you watching? Eh? What are you watching? Eh? Eh? What are you watching? What did you watch? Come on then. Come on then. Yeess. What do you see? What did you see? Yeess. Yeess. What do you see? Tell me the big stories then. Tell me the big stories. Tell me. Tell me. Come on then. Yeess. Mm-mm. Yeess. Ooooh. What are you doing? What are you doing? What are you doing? Eh? What are you watching? What are you watching? What are you watching? What are you watching? Yeess.

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